IRON & COAL TRADES REVIEW

JANUARY 8, 1960

Vol. 180

No. 4,773

ESTABLISHED 1866

Incorporating "STEEL and IRON" and "COAL"

Organ of the National Association of Colliery Managers and the Association of Colliery Managers in India

Published each Friday

Annual Subscriptions *United Kingdom....52s.*
Abroad....60s. *Payable in advance*

Editor:
F. H. HARLEY

Mining Editor:
H. COOPER, A.M.I MIN.E.

News Editor:
P. E CARDEN

Associate Editors:
D. GRIMMER; R. M. HOWSE; B. M. DAVEY; G. L. WARD; C. J. COUPE

District Representatives:
ERIC PERRIN (North Eastern) Tel.: Whitley Bay 28018
A. D. H. CURRIE, (Northern) Tel.: Ringway 2452
E. J. SWEETING (Midlands) Tel.: Plumtree 2585
E. G. COLLIS (Southern Area) Tel.: TRAfalgar 6171
T. H. SMITH (Scotland) Tel.: Dumbarton 1046

Advertising Manager:
F. BARRINGTON HOOPER, B.A.

Production Manager:
R. J. LOVELL

Publisher: H. J. DWYER
Circulation Manager: E. T. GRIFFITHS

AN INDUSTRIAL NEWSPAPERS PUBLICATION

Published by
INDUSTRIAL NEWSPAPERS, LTD.

Directors:
BARRINGTON HOOPER, C.B.E., *Chairman and Joint Managing Director*
F. BARRINGTON HOOPER, B.A., *Joint Managing Director*
F. R. LEWIS
JOHN HOOPER
D. HORN
E. G. WESTON, *Secretary*

JOHN ADAM HOUSE, 17-19, JOHN ADAM STREET, ADELPHI, LONDON, W.C.2

Telephone: Trafalgar 6171 (Private Branch Exchange)
Telegraphic Address: "Zacatecas, Rand, London"

In this Issue—

STEEL-TUBE RECUPERATORS
Operational Experience Described - - - - page 63

SURFACE MANPOWER AT MINES
Labour-saving Measures in Yorkshire - - - page 67

INTERNATIONAL STEEL RESEARCH
Scope and Limitations of OEEC Activities - - page 73

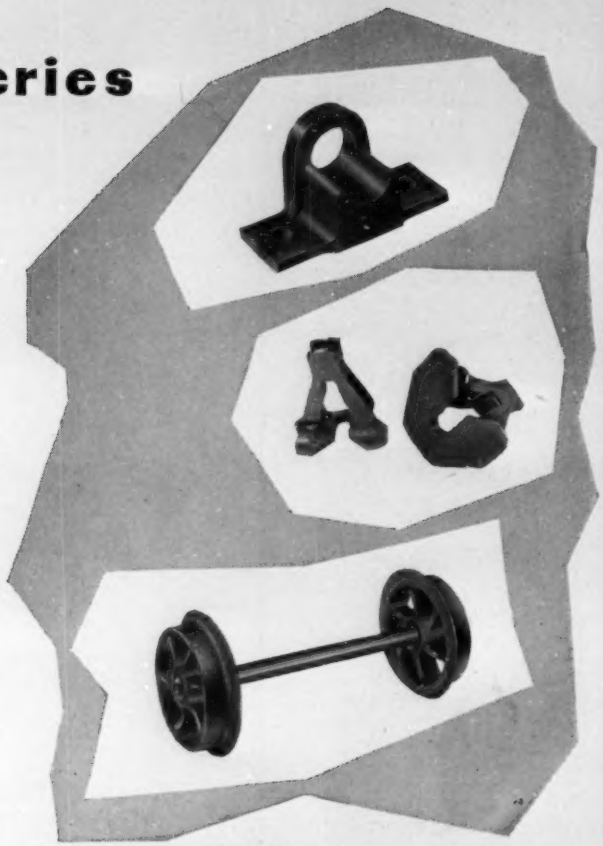
COAL-FACE MECHANIZATION
Some Failures and Successes in Yorkshire - - page 75

ELECTRIC REDUCTION OF IRON ORES
Experience with the Flash Bed in West Germany - page 79

	PAGE
Leading Article: Mine Compensation Payments	53
Wear's Increased Oversea Coal Shipments	54
Peace at Last in US Steel Industry	54
Oil Industry is Privileged	55
Retirement of John Summers' London Manager	55
South Durham Steel & Iron Honours a Veteran	56
Dorman Long Optimism	56
Iron and Steel Trade	57
SCOW Steelworkers' Strike Soon Over	57
Passing Thoughts	58
Auchengeich Pit Disaster	69
Minister of Power in Yorkshire	61
Simon-Carves Coke Ovens for RTB Strip Mill	61
Obituary	62
US Tractor Company Forms UK Subsidiary	62
British Iron and Steel Industry Translation Service	66
Forthcoming Events	74
Metallurgical Patents in the US	77
New Economy Mine Tube Cleaner	78
Underground Waters of the Kent Coalfield	78
Swedish Iron Mine to Yield 1,000,000 tons Annually	83
Ironmaking at Barrow	83
Underground Locomotive Signalling System	84
BS on Caking and Swelling Properties of Coal	84
Mining Oversea	85
High-strength Stainless Steels	87
Distribution of Coke in the US	88
Cheaper Ammonium Sulphate Production	88
Earthmoving Equipment for Ironstone Mine	88
Tubular Lining for Tunnels	89
Repairing Damaged Conveyor Belts	90
Stirling and Clackmannan Coalfield	90
New Year Honours	91
Mining Qualifications Board	94
Company News	95
South Durham Steel & Iron's Dividend Policy	96
The Coal Trade	97
Over 4 per Cent. Less Coal in 1959	97
Appointments	98
Personal	99
Recent Wills	100
More Pig-iron, Coke, and Iron Ore by United Steel Group	100
News in Brief	101
Law Cases	101
Non-ferrous Metals	102
Industrial Output Still Rising	102
ECSC Scrap Fraud Alleged	102
Good Demand for Brook Motors' Products	102
Coalfield News	103
TUC to Back Miners' Coal Campaign	103
Board Changes	104
Company Statement: The United Steel Companies, Limited	105
The Scrap Markets	108
Nuclear Power Group's Fusion	108
Esso Plans 75-mile Pipeline at Cost of £2,500,000	108
Orders Placed	110
Engineering Unions Revive Wage Claim	110

Steel Castings

For Collieries



Osborn steel castings undergo rigorous service in mines throughout the world. Tub and mine car wheels are manufactured in Toughened Cast Steel and "Titan" Manganese Steel. They are supplied to N.C.B. specifications, as loose wheels or as pairs with axles.
Other products include pedestals and couplers. Specify *Osborn* and be sure of quality and long life.

With acknowledgements to Messrs. W. G. Allen & Sons (Tipton) Ltd., and N.C.B. (N.E. Div.)

OSBORN

SAMUEL OSBORN & CO., LIMITED
CLYDE STEEL WORKS, SHEFFIELD

IRON AND COAL
TRADES REVIEW

Vol. 180 January 8, 1960 No. 4,773

Mine Compensation Payments

THE House of Lords has now resolved the question as to the tax position of colliery companies in respect of the interim compensation payable to them for the compulsory acquisition of their undertakings under the Coal Industry Acts. The decision was given in consolidated appeals brought by three colliery companies, now in liquidation.

The effect of nationalization on colliery companies has now been settled by a number of decisions. The result of the take-over by the National Coal Board of the assets of such companies, it was held, was to sweep away, as it were, the substratum of the company. The company ceased, therefore, to function as a trading company, and it was left merely with assets in a different shape. These assets consisted of the compensation that was payable under the Acts in respect of the compulsory purchase of the company's undertaking.

Owing to the fact that a considerable time would elapse before the actual amount of compensation that was payable could be ascertained, it was felt that it would be unfair to such companies if they were kept out of their compensation for a long period. Accordingly, Parliament provided that such companies should receive their compensation in instalments, until a final settlement could be made. The instalments were to be in the nature of interim payments.

Two questions of considerable importance arose. Firstly, there was the question as to the tax status of such companies. Secondly, there was the question as to whether these interim payments were to be regarded as income of the company and accordingly taxable. This second question raised the point as to the basis on which the interim payments were to be assessed, if they were held to be taxable.

On the first question, the courts held that the effect of the compulsory acquisition was to convert the companies from trading companies into investment companies; that is, in substance, companies whose assets consisted merely of capital investments, these investments being represented by the compensation payable for the compulsory acquisition of their assets on nationalization. If the company happened to be under the control of not more than five persons and was neither a subsidiary company nor a company in which the public was substantially interested, the position would be that all the income of the company would be regarded as being apportionable among the shareholders, who would have to include such income in their income which was assessable to surtax.

The second question, as to the nature of the interim payments, was decided also in favour of the Inland Revenue. The interim payments were held to be income for tax purposes. This decision raised the further question as to the basis of assessment of interim income. Was it to be regarded as income of the years in respect of which the income was paid, or as income of the year in which it was in fact received? The companies supported the former view, the Revenue the latter. If the payments could be related to the particular years in respect of which they were being made, the incidence of the tax would not be so harsh on the companies, since the amounts could be split up. If, on the other hand, the payments were regarded as income of the year in which they were received, then a far greater tax liability would have to be borne. The burden, of course, would fall on the shareholders of the company, who might have the rate of surtax raised against them.

In order, however, that the income should be treated as the income of the year in which it was received, it would have been necessary for the Revenue to establish that these payments were in the nature of annual payments, so as to be taxable under Case III of the Income Tax Acts, when Rule 21 of the General Rules would be applicable. And if General Rule 21 was applicable, tax, it was argued, would have been deductible by the Crown at the source, under the provisions of that rule.

The House of Lords, however, held that General Rule 21 could not be applied to payments made by the Crown, for, on examination, the description of the payments referred to in the rule was not appropriate to cover payments out of moneys provided by Parliament. Rule 21 operated, not as an authority to deduct tax, but as an obligation to do so, and its whole purpose was to enable the Revenue to recover from the payer, who, in this case, would have been the Crown, tax which was really due by the payee. The Crown did not fit at all into the scheme of the rule.

The question then arose whether the interim payments were to be regarded as "annual payments" falling within the scope of Case III. If Case III applied, then the interim payments would have been assessable for the year in which they were received, if they could be regarded as "income arising" in such year of receipt. As the sums paid out to the companies were in the nature not of trading receipts, but of pure profit income, the companies fell into the class of ordinary indivi-

duals, not assessable and not paying tax accordingly, until they actually got their money. The House rejected the contention by the companies that even so the payments should be spread back over the years in respect of which they were paid.

In the view of the House of Lords, no income arose until the money was received, and it was not possible to hold that, after its receipt, the income represented by the interim payments arose not at the time of the date of receipt, but at some earlier date. And if the income did not arise in the earlier years, there was no ground justifying taxing it as part of the earlier year income. The interim payments, although they might be regarded as having "accrued" during the earlier years could not be regarded as having become "due and payable" during such earlier years. Accordingly, the payments were to be regarded as annual payments—for they were pure profit income and were of a recurring nature—which had "arisen," because they were only then due and payable, in the year in which they had been received by the companies. Accordingly, the payments were part of the actual income of the appellant company for the years in which they had been actually received.

Wear's Increased Oversea Coal Shipments

REDUCED coastwise shipments were responsible for a decrease of 130,000 tons to 2,185,000 tons in exports of coal from the port of Sunderland during 1959 compared with the previous year. The fall of 200,000 tons in coastwise trade was partly offset by an increase of 70,000 tons (50 per cent.) in shipments to foreign countries. These figures were given by the chairman of the River Wear Commissioners, Mr. S. J. Adamson, on Thursday of last week.

The chief customer abroad had been Denmark, which had increased its imports from the Wear by about 35 per cent. Mr. Adamson said that there had also been "a very welcome revival" in shipments to Norway and Portugal.

General imports at Sunderland in 1959 amounted to 345,000 tons, compared with 325,000 tons in 1958. For the first time in the port's history imports of petroleum spirit and oils exceeded 200,000 tons. Decreased tonnages of scrap metal, iron and steel, and pyrites residues were imported.

Reviewing future prospects, Mr. Adamson said that the coal industry, which was so vital to the port, was passing through a very difficult phase. "We can only hope that the improvement in the coal export trade will continue and that the coastwise shipments will rise again."

MANUFACTURE AND SALE of ship's propellers and other marine products will be undertaken by a new company formed by Stone-Platt Industries, Limited. The new subsidiary, J. Stone & Company (Propellers), Limited, will take over business formerly carried on by J. Stone & Company (Charlton), Limited. Other business carried on by J. Stone & Company (Charlton) will continue exactly as before.

Peace at Last in US Steel Industry

COMPROMISE proposed by Vice-President Nixon and Secretary of Labour, Mr. James Mitchell, has settled the US steel dispute—the longest and costliest in the industry's history. It started eight months ago and at one time looked like being resumed when the period of the Taft-Hartley injunction was ended this month. On Thursday of last week, Mr. Nixon again urged on the leaders of the 11 big steel companies that Congress was bound to intervene if a voluntary settlement were not reached before January 26—the end of the 80-day Taft-Hartley truce.

Pending ratification of the agreement by both sides, its terms would not be announced, said Mr. Mitchell. The terms were presented to the union's Wage Policy Committee on Wednesday. Mr. Roger Blough, chairman of the United States Steel Corporation, said that the terms were "not what we tried so long and so hard to obtain." The cumulative cost of the new agreement to the industry would be more than $1,000,000,000 (about £375,000,000) and, he added, "that astronomical figure is something to think about." However, according to Mr. Blough, US Steel does not plan to make any general price increase "in the immediate future."

It is rumoured that the agreement is for a 30-month contract expiring on June 30, 1962, and providing about a 39 cent per hour increase over that period. The steel industry estimated its last offer as totalling about 30 cents an hour over a 36-months' period. It is also believed that the controversial issue of work rules, which the industry has insisted were a chief requirement in any settlement, had been "shelved for all practical purposes." The issue would be submitted for study to a joint committee, but this would have no power to make binding recommendations.

The dispute is estimated to have cost more than £2,142,000,000 in wage and production losses.

The US annual steel production capacity rose for the 13th straight year to a new peak of 148,570,970 tons. The American Iron and Steel Institute states that the new capacity is well over the industry's record yearly output of 117,000,000 tons in 1955.

Kelvin & Hughes Agreement With US Firm

AGREEMENT for the exclusive right to manufacture and sell the non-destructive testing equipment of the other partner has been concluded by Kelvin & Hughes, Limited, Wembley (Middx), and the Curtiss-Wright Corporation, of the US. The agreement covers instruments for the inspection and measurement of materials and equipment employing ultrasonic techniques in all industrial fields.

Kelvin & Hughes will represent both interests in the UK, the Commonwealth (except Canada), and Europe, and Curtiss-Wright in the US and northern America. Each party to the agreement will offer full sales and service facilities on the joint range of equipment.

NEW BRANCH OFFICE and depot, at 62A, Station Road, Kings Langley, Herts (telephone: Kings Langley 4465), has been opened by Industrial Pumps, Limited, Nottingham, sole concessionaires in the UK for Flygt pumps. Mr. John Davidson is the manager of the new depot.

Oil Industry is Privileged

NUM SECRETARY PUTS UNION VIEWPOINT

ALLEGATIONS that Britain's oil industry enjoyed a privileged place in the national economy to the detriment of coal, were made by Mr. Will Paynter, general secretary of the National Union of Mineworkers, speaking at a luncheon of the Coal Industry Society in London on Monday. The NUM, he said, was not opposed to the use of fuel oil in industry, but to the use of oil to the extent of injuring or even destroying the coal-mining industry. A balance must be fixed between the use of coal and oil.

His union, he said, viewed the situation primarily from the standpoint of the economic and political conditions from which it had arisen. It identified the fuel crisis with the major recession that had taken place in the country and felt the industry's troubles had been aggravated by the Government's economic policies. The development of open-cast mining, the importation of fuel, and the working of extended hours in the industry—measures introduced to meet the shortage—had become a very serious impediment as soon as the period of difficulty had passed, so that although a general industrial recovery was now taking place, its effect was not being felt in the coal industry.

Commenting on fuel utilization, Mr. Paynter said that during the recession there was a drive to improve methods of using fuel and so reducing costs. But there was also the policy pursued by the Government with the object of free competition between different fuels. The situation was farcical when, with stocks amounting to 36,000,000 tons on the ground, the gas industry importing methane, and dual-fired electricity generating stations using oil fuel, the Minister of Power claimed there was co-ordination between the nationalized industries.

"Jungle Law"

"Free competition is being pursued because it provides the climate necessary to establish fuel oil, and the Government is guilty of discriminating on behalf of the oil companies," Mr. Paynter maintained. Competition from oil was the biggest factor with which the coal industry had to contend. "We are going to have to examine who are our friends—who is with us and who is against us." Fuel oil was not the residual product of the refineries—it was the end product, and it was being sold at less than the cost of the material from which it was made. It was, in fact, being dumped. The NUM was taking a strong line against this and an approach was being made to the TUC seeking support for a Government reappraisal of policy, especially in regard to the importing of fuel oil.

The mining industry was the victim of a policy of "jungle law"—the "survival of the fittest," the speaker declared. If that was to be the future prospect, the mineworkers could use that weapon themselves. "We are not fighting because we want men to go down into the bowels of the earth to dig coal," said Mr. Paynter. "We will welcome the day when it will no longer be necessary for men to take these risks. But we have to measure the present need in the western world. It is important that the coal industry should not be run down, because it could have a serious social impact not only on future generations, but on ourselves."

Local authorities, public bodies, and other organizations which had joined in protesting against the closure of collieries had often been responsible for the movement from coal- to oil-burning. If the need arose the mineworkers could make it very difficult for these bodies, he said.

The labour force in the coal-mining industry, which stood at 712,000 in 1958, was being reduced by the Government to 595,000 in 1960—a cut of 117,000 men in a period of less than three years. Redundancy, thanks to co-operation between the NCB and the NUM, had been kept to a minimum, but there was still a reduction of opportunity in the mining communities of 45,000. "As a union we will oppose policies that result in unemployment or hardship for our members," Mr. Paynter emphasized. It was up to the Government to provide alternative industries within easy reach of areas affected by pit closures. "We welcome change," he said, "but change must be regulated. We intend to demand security for our men and this the NUM will strive to achieve during 1960."

Retirement of John Summers' London Manager

MR. M. J. B. WHITBY, who has retired from his position as London manager of John Summers & Sons, Limited, the Shotton (Ches) sheet steel manufacturers, had been associated with the company for nearly 50 years. His successor is Mr. Francis H. Smith, formerly the company's market research and development manager.

Mr. Whitby has many connections in the City of London. He is a member of the Court of Common Council of the City, and a Past Master of the Worshipful Company of Innholders. He is keenly interested in boxing, and from 1949 to 1958 he served as president of the Belsize Boxing Club, the oldest amateur boxing club in Britain.

COMMISSIONING OF a new automatic plating machine at its Haydock (Lancs) factory, is announced by Thomas Crompton & Sons, Limited, manufacturers of ironmongery for the aircraft, building, marine, automobile, and railway industries. The plant, which, in an eight-hour shift, plates up to 30,000 parts with nickel or chromium, replaces a hand-operated system.

South Durham Steel & Iron Honours a Veteran

"WE had a good captain at the helm and we shall miss him tremendously," said Mr. Donald Morris, who has just succeeded Mr. W. W. Crowe as London manager of the South Durham Steel & Iron Company, Limited, at a dinner given by the company to mark Mr. Crowe's retirement at the May Fair Hotel, London, W.1, on Monday.

Mr. Crowe, who was born in 1893, joined the Cargo Fleet Iron Company, Limited, at the age of 17. That company was incorporated in the South Durham Steel & Iron Company in 1928 and, with the exception of the period during which he served with distinction in the Army in the first world war, Mr. Crowe's services have been devoted to South Durham Steel & Iron.

Mr. Morris said he had known Mr. Crowe for over 20 years. He became his assistant when Mr. Crowe was appointed London manager in 1954.

Mr. E. F. Ward, an executive director of the company, presided on Monday over a dinner party of 30 that included a small number of guests. He was supported by Mr. W. A. Metcalfe, an executive director, who is also secretary of the company, and by Mr. A. M. McQuistan, assistant general manager at the Stockton-on-Tees pipeworks, Mr. B. G. Clark, constructional works manager at Stockton, Mr. T. Downie, pipeworks manager at Stockton, and Mr. T. A. Mead, the company's sales manager.

The guests included Mr. R. Hays and Mr. H. St. V. Longley Cooke (Iraq Petroleum Company, Limited), Mr. McA. Harris (Northern Aluminium Company, Limited), Mr. W. J. Moodie (Mines Trading Company, Limited), and Mr. Arthur Fleming (secretary of the British Steel Producers' No. 2 Conference).

Proposing the health of Mr. Crowe and his wife and daughter, Mr. Ward said that Mr. Crowe, in his long association with the company, had made a host of friends; his name had, in fact, become a byword both in the company and in the industry. He had been one of the cornerstones in the company's development. Mr. Ward hoped that the company would be able to continue to call on the benefit of Mr. Crowe's vast experience.

After thanking Mr. Ward, the company, and the guests individually, Mr. Crowe expressed his thanks "to the very loyal and pleasant staff in London." He wished Mr. Morris every success. Then followed a series of reminiscences. "When I went to Cargo Fleet . . . there was practically no oil industry, no wireless, no plastics. It was the day of the musical comedy. It was the end of the Victorian period, a period of great stability."

Good wishes "on behalf of the rough boys of the north" were expressed by Mr. Metcalfe. "Bill Crowe among the oil companies bears a name which I don't think can ever be repeated," said Mr. Hays. He was the man who got what the oil companies wanted when they wanted it most. Both Mr. Hays and Mr. Mead paid tribute to the value of Mr. Crowe's sound advice.

Others who expressed briefly their gratitude and best wishes to Mr. Crowe on his retirement were Mr. Fleming, Mr. G. Stewart (manager of the South Durham Steel & Iron Company's London stockyard), Mr. Moodie, Mr. Longley Cooke, Mr. Downie, Mr. E. G. Askey (South Durham's London office), and Mr. Clark.

Wishing Mr. Morris every success in his new appointment, Mr. Ward assured him that he would receive the same support that had been accorded Mr. Crowe in the past. Thanks to Mr. Ward and the directors for their hospitality were expressed by Mr. B. Keith, the company's Leeds area manager.

At an informal lunchtime ceremony, attended by a few of his friends at the Bodega, Bedford Street, London, W.C.2, on Tuesday, Mr. Crowe was presented with a pewter tankard carrying a musical reminder that "Another Little Drink . . ." The presentation was made by Mr. Victor Harvey, London manager of the Guest Keen Iron & Steel Company, Limited, and an old friend of Mr. Crowe's.

Dorman Long Optimism

"STEEL is a growth industry and with its progressive outlook, backed by research and operational ingenuity, is likely to remain so," states Sir Ellis Hunter, chairman of Dorman Long & Company, Limited, in his annual review. Free from political threats, at any rate for some years, the industry can pursue its task of improving efficiency and raising production.

The British share of export markets will be preserved and the growth looked for achieved, he states, if further advances in production methods and manufacturing techniques are actively sought. "We cannot assume that competition from alternative materials will not develop, but I am confident that with improving techniques the inherent advantages of steel will continue to be recognized."

Present demand for steel products had permitted most of the plants to operate on a satisfactory basis, but it was not yet possible to say how much of the demand was due to restocking and how much was passing directly into consumption. During the current financial year, which opened on October 1, production had further improved and in the first week in November there was a record output of rolled steel. The universal beam mill at Lackenby was now operating on a three-shift basis and the large-scale modernization of the Middlesbrough wire works had been completed.

Of £5,952,000 (£6,066,000) group profits, before tax, in the year ended September 30, 1959, bridge building, engineering, and chemical activities were responsible for £2,668,000 (£2,915,000), or 45 (48) per cent., and iron and steel for the balance of £3,252,000 (£3,151,000).

The year's dividend is repeated at 12 per cent. and a one-for-two scrip issue proposed. On capital thus increased a 10 per cent. dividend is forecast for the current year. Fixed assets are responsible for £54,260,000 (£54,840,000) and current assets for £33,750,000 (£34,860,000) of group assets of £88,040,000 (£89,740,000). During the year £3,500,000 of the loan from the Finance Corporation for Industry, Limited, has been repaid and a further £4,000,000 since the end of the financial year.

"The City": How it Works

PUBLIC conference to explain in simple language the various functions of "The City" has been organized by the Industrial Welfare Society and will be held in London on February 23 and 24. It aims at providing company directors and senior industrial and commercial executives with a clear understanding of this vital section of the national economy.

The conference will be addressed by a number of eminent City men.

A NEW CHEMICAL research laboratory is to be built by Coalite & Chemical Products, Limited, at its Bolsover (Derbyshire) works.

Iron and Steel Trade

STEEL OUTPUT FORECAST

24,000,000 Tons Expected This Year

OUTPUT of steel in Britain this year is expected to be about 24,000,000 tons, which would be an increase of 4,000,000 tons on last year's output. Pointing out that in both 1958 and 1959 the steel industry spent some £100,000,000 on new plant and development and raised its production capacity by about 1,000,000 tons each year, the British Iron and Steel Federation states that this was done despite the fact that existing capacity, except in a few cases, was not being fully used.

Only in the case of steel sheet has there been shortages due to an unexpectedly swift boom in cars, rising sales of household goods and electrical machinery, and a shift in demand from one kind of steel sheet to another. Cold-reduced sheet production last year was, however, 13 per cent. above that of 1958 and is expected to rise again by perhaps as much as 20 per cent. this year. Further expansion at existing strip mills and the construction of two new mills at Newport and Ravenscraig, work on which is being accelerated, will meet likely demand for sheet and tinplate.

Prospects suggest that there will still be some margin of capacity this year in certain heavy steel products, as a result of continued slackness of demand from railways, collieries, and shipbuilders. Demand for other types of steel, however, is expected to rise still further. Continued modernization and expansion—at a cost of over £100,000,000 a year—will provide an efficient steel capacity of over 30,000,000 tons by 1965, thus providing a sound basis for competing in world markets.

Pig-iron

In varying degrees all grades of pig-iron are now participating in the trade revival. The output of basic iron is steadily rising and will need to do so to keep pace with the requirements of the steelmakers. The full output of hematite is passing promptly into consumption and foundry requisitions are moving in the right direction.

The substantial rise in iron-ore imports is a further significant development which indicates the expectation of full employment for the blast furnaces.

Ferro-alloys

The call on most items is at much the same level as of recent weeks, with ferro-silicon a major feature of the market and ferro-tungsten continuing to be somewhat quiet. Certain consumers continue to support ferro-sulphide and ferro-phosphorus, and there is a fair demand for calcium silicide. Steady attention is given to ferro-chrome, and ferro-manganese and silico manganese are quite active.

Ferro-niobium is well supported and ferro-titanium is in fair request. There is a good demand for ferro-molybdenum and ferro-vanadium is also of some interest.

Semi-finished Steel

Supplies of all forms of semi-finished steel are working under extreme pressure and it would not be surprising if the intake of marginal tonnages of semis from western Europe were increased.

Billet and rod mills are working to the limit of their capacity and re-rollers, overloaded with orders, are pressing for more material.

Finished Steel

The task of the steel industry in 1960 is to adapt itself to the changed pattern of demand. Slackness in the shipbuilding trade still persists, but the impact of this decline on the plate mills has been modified by big contracts for steel pipelines. For railway and colliery requirements there are no alternative outlets and continued slackness in this branch of the steel trade seems to be indicated. But the already big demand for other types of steel products, ranging from cold-reduced sheet and light steel for durables to heavy constructional steel, is still gathering momentum and works are now assured of full employment for the first quarter of the current year, with delivery dates extending well into the second quarter.

SCOW Steelworkers' Strike Soon Over

MORE than 700 members of the Transport and General Workers' Union at the Abbey Works, Port Talbot, of the Steel Company of Wales, Limited, decided on Monday to return to work after a strike which began last Friday when 16 men were suspended for leaving work two hours early on New Year's Eve, apparently to celebrate. A spokesman for the company said that the men had been warned beforehand that suspension would be the penalty for leaving early.

After a mass meeting Monday, Mr. Tom Davies, the union's Swansea district secretary, said: "The walk-out was unconstitutional, but we do feel that there should have been consultations between the management and our local representative and even the district office if there had been failure to agree on any disciplinary action." He maintained the company had "flouted the constitutional procedure laid down regarding strikes."

UNDER A NEW licensing agreement Weldall & Assembly, Limited, Stourbridge (Worcs), will manufacture and sell on a world-wide basis, with the exception of the Americas and Canada, the products of Fried Steel Equipment Manufacturing Corporation, New York.

Passing Thoughts . . .

INDUSTRY can only build with the young material which reaches it from school. I emphasize that clear speech, reading, writing, and the ability to do simple calculations are industry's greatest needs. Management at all levels should possess technical skills, but the essential characteristic is the provision of leadership. The manager in industry must, of course, know a great deal about his business affairs. But the higher a manager aspires to rise the more essential does it become to have the ability of mixing with all ranks, speaking clearly when the need arises, and being able to put his thoughts in terms which will be clearly understood by all.—SIR ROBERT MACLEAN, chairman of Scottish Industrial Estates, Limited, at the congress of the Educational Institute of Scotland in Edinburgh.

SIR ROBERT MACLEAN

The prospects for the steel industry in 1960 *appear very good, despite the shadow falling on such long-standing and large customers for steel as railways, the coal mines, and shipbuilding.*—SIR WALTER BENTON JONES, *chairman of the United Steel Companies, Limited.*

Steel looks as if it may be entering a decade of increasing competition. The next five-year plan may therefore need to place rather more emphasis on modernization and improvements in efficiency as opposed to sheer expansion than was the case in previous plans.—Financial Times.

In Russia, they are turning out 1,400 *trained graduate welding technologists each year, and are saying this is not enough. We are not turning out any.*—MR. E. SEYMOUR SEMPER, *president of the Institute of Welding, at the annual dinner of the Sheffield and District Branch.*

In facing the challenge of the next few years British shipbuilding has many signal advantages not least the constant support of the British shipping industry. But these advantages are not so great that they cannot be squandered by the failure of management and men to put their house in order.—The Times.

The National Coal Board has done a magnificent job in 1959. *The board's leaders have used the human touch rather than the ruthless business touch in dealing with the industry's problems.*—MR. ERIC LOCKETT, *general secretary of the Yorkshire Area of the National Association of Colliery Overmen, Deputies, and Shotfirers.*

Industry is not in favour of compulsory education for all children up to the age of 16 because that would perpetuate the ragged system of school leaving that exists now.—MR. L. S. NEWTON, group education officer of Pilkington Bros., Limited, the St. Helens (Lancs) glass manufacturers.

Metallurgists and scientists are keeping Sheffield in the forefront of modern industrial progress and on them rests the future of the special steel industry of Sheffield. It is a grave responsibility.—MR. P. J. C. BOVILL, *Master Cutler, and managing director of Newton, Chambers & Company, Limited.*

It is an absolute disgrace to our national intelligence to import oil in the quantities we do when sufficient supplies of coal are at our feet to meet all our needs for heat and power. . . . Unfortunately, coal is nationalized and has little chance against the thousands of acute brains striving to promote the use of oil and to make a profit out of it.—Letter in the Financial Times.

For businessmen's journeys, unlike the tourists', individual attention is profitable: the agents have to know whether their clients are taking their wife or mistress, whether they want "VIP treatment with roses," or "unobtrusive VIP treatment."—"MAMMON," *in The Observer.*

Again, I see, complaint is made about the lack of wagons for coal. I can't understand why, because on the Calverton branch line there are a mile or two of empty wagons, which have been there for a long time. Have these been lost sight of in the confusion of nationalization? In the old days wagons were owned by companies and private people, who saw to it that the wagons were kept on the move or they lost rentals. —Letter in the Nottingham Guardian Journal.

So many people change their jobs so frequently today that the man who stays wakes up one morning to find he is head and shoulders above the others in his field, if indeed there are others.—*Business, a journal for management.*

It seems odd that a boy of 15 can be employed in a coal mine, with all its attendant dangers, but cannot sell ice cream on the street.—Solicitor at Doncaster West Riding Court.

In a Stafford factory about 50 Electrical Trades Union men went on strike complaining that they are not allowed to talk, laugh, or whistle; and at a Luton works there was a stoppage because the strikers said they were too hot.—*Report in the Daily Telegraph.*

The weather is fair, and the barometer is steady. It would be an unwise captain, however, who did not look at it in every watch, and he should not sleep in his cabin without giving orders that he is to be awakened if there is any signs that the barometer is falling.—LORD CHANDOS, chairman of AEI, in an article in the Financial Times on "The Outlook for British Industry."

The great companies are lush with money. Orders pour in for almost everybody except the shipbuilders and the Coal Board—GEORGE MCCARTHY, *city editor of the Daily Herald.*

Without any central guidance of the location of new factories nowadays, most light manufacture will drift to great cities—the London area most of all—because business leaders and their wives like living in these areas.—MR. DOUGLAS JAY, Labour MP for Battersea North, in an article in Forward, the Socialist weekly.

Sir James Bowman runs the coal industry, not me.—MR. RICHARD WOOD, *Minister of Power.*

The rate of investment in steel plant in Britain has remained stable over the past three years and it is estimated will not be increased this year. At a time of economic expansion, such caution is not an advantage. If little is ventured, little will be gained.—Western Mail.

Auchengeich Pit Disaster

EVIDENCE OF TROUBLE WITH VENTILATION FAN

EVIDENCE that a ventilation booster fan, which is thought to have caused the underground fire at Auchengeich Colliery, Chryston (Lanarkshire), last September, had caught alight three months before the disaster, was given at the inquiry into the accident which opened in Glasgow High Court on Monday. The accident caused the death of 47 miners who were stated to have died of carbon monoxide poisoning. Smoke and a smell of burning were noticed earlier on the evening of September 17 and the fan was halted twice for running repairs and inspection a few hours before the death of the men.

The inquiry, which is expected to last about two weeks, is being conducted by Mr. T. A. Rogers, HM Chief Inspector of Mines, acting as Commissioner for the Ministry of Power. In the disaster one trainload of men, on man-carrying bogies, was successfully extricated after an underground fire, but another trainload was overtaken by fumes and gas.

MR. T. A. ROGERS

At the start of the inquiry, Mr. Abe Moffat, president of the Scottish Area of the National Union of Mineworkers, who is appearing for the union, said he might ask for an adjournment if there were any conflict of evidence concerning "the locus of the accident." He said it was still impossible to reach the area of the fire 1,000 ft. underground and a mile from the pit bottom because the colliery had been flooded to extinguish the fire.

Deputy's Evidence

Mr. Thomas Campbell (65), day-shift man-rider haulage driver, who had charge of the bogies on which the 48 men went underground, said he smelt smoke and saw a slight haze when he went down the pit. He was told by an overman that it was coming from a booster fan and that someone was investigating it. After the first bogies reached the end of their run he got the usual signal to bring them out. Before they had travelled more than a few yards he had received three signals to stop and restart. When he had got them to within 200 ft. of his own haulage engine he was enveloped in smoke and could no longer see the indicator lights.

The witness said he then heard a voice shouting and was afraid that if the bogies were kept moving someone might be injured in the roadway. After that he was completely enveloped in smoke and the atmosphere got extremely thick as he made his way out. He had groped his way to the fresh air base when Mr. Thomas Green, the only man on the bogies to escape, was carried out by men who had gone in from the airlock. Cross-examined, Mr. Campbell said there had been a sudden worsening of the smoke haze which earlier had not caused him any concern. He received no message to stop the second bogie train, but after it had gone in he was told to let no more bogies away.

Mr. James Love (62), nightshift overman, said that on the night before the disaster there was no attendant on the fan and he himself had made a temporary repair. The engineers seemed quite satisfied with what he had done. Later he received a message that the fan had given way again and the undermanager said he thought he had better go down and see about it, but by the time the undermanager had got down the pit word had come through that the fan was on fire.

In reply to Mr. Moffat, Mr. Love said there had been fairly excessive slipping and the fan had stopped twice that night. When a fan was stopped in a return airway there were instructions to open the three doors and notify the fireman to take every safety precaution.

Mr. Moffat: "Did you tell the fireman to do anything about the ventilation that night?"—"No I started up the fan first."

Mr. Moffat: "Did you receive an instruction to put a man on the fan on this night shift?"—"No, not to put a man on, but to make sure it was attended."

The witness said he had accepted responsibility for the fan. He suspected something was wrong with the belt—it seemed to be stretching and that was why it was slipping. He had put water on it to cool it and had reported the matter. In reply to a question he said that the belt did not seem to be in bad condition, but when a piece he had cut off was shown to him in court he accepted that it was. He further agreed that after he had cut the belt it still gave a good deal of trouble and this indicated that it must have got worse.

The deputy overman, Mr. Alexander Cunningham (62), described how he and 20 other men were travelling in bogies from the pit bottom along the return airway when they found a ventilation booster fan on fire. A second bogie with more miners was following. Earlier that week he had reported that the fan belt was slipping. On the morning of the disaster there was a slight haze in the pit which he thought was due to smoke from a burning bing being drawn into the pit. He had seen haze in the pit before.

When he got to the fan the belt and blades were on fire. He and other men tried to put it out with stone dust and sand and a man went for a fire extinguisher. They got the fire in the fan almost out, but the belt was burning and their efforts to put that out were unsuccessful.

Mr. Moffat: "Would it not be better if you first took steps to protect human lives?"—"I didn't think that was necessary, but I see that now."

Mr. Moffat: "You knew there were men coming into the pit behind you. What steps did you take to

stop them? "—"I had heard an overman give a warning that no more men were to come in."

Mr. Moffat: "You never gave it a thought? "—"Oh no. I am not that callous a man. I was trying to extinguish the fire for the safety of the men."

Mr. Cunningham went on to say that he did not accept that the fan was his responsibility. No one had ever instructed him to inspect it, but he took an interest in it and examined it each afternoon. He had been told that the haulage man would be looking after the fan.

Questioned further by Mr. Moffat, the witness said he had not given any consideration to the regulations dealing with fire in a pit. He had read what to do when fire was suspected, but could not remember what it was. He felt his main concern was to get to the scene of the fire and when he found the blaze he was alarmed. That was why he had tried to put it out.

Replying to Mr. Harold Leslie, QC, who is appearing for the National Association of Colliery Overmen, Deputies, and Shotfirers, Mr. Cunningham said there was no expression of concern from any of the miners before they reached the fan. The overman was there and said he would telephone to give warning of the fire.

Examined by Mr. J. O. M. Hunter, QC, on behalf of the National Coal Board, the witness said he had no knowledge of the extent of the fires on the other side of the fan and it was only afterwards that he learned these were out of control and that first-aid measures would not have been any good. He repeated evidence he had given at the previous investigation into the disaster when he had said that he did not know anyone was in the return airway.

Dr. James Imrie, chief medical officer to the Glasgow police, said that death in each case had been from carbon monoxide poisoning and would have been "rapid and painless." The lowest concentration of gas in the disaster area had been 40 per cent. and even 40 per cent. combined with the general lack of oxygen would have proved fatal.

"Extinguishers Tampered With"

On the second day of the inquiry an assistant overman, Mr. James Hind Dickson (52), said that after going down the pit on the morning of the disaster he found the entire length of a fan belt in flames. He switched off the electric motor and brought a fire extinguisher from nearby, but neither he nor an experienced firefighter could make it work. The same happened with a second extinguisher and he phoned the surface for extinguishers and hoses. By that time all the appliances in the area—there might have been five—had been tried and dust and sand had also been used without success.

Mr. Dickson also said that the nearest hydrant was not functioning and another, 200 yds. away, was uncoupled.

He alleged that a hose kept near the fan house and fire extinguishers had been tampered with and even since the disaster extinguishers had been interfered with. It was not connected with their use for fire-fighting or for training exercises.

He told Sir Andrew Bryan (for the National Association of Colliery Managers) that when he first saw the fire he had no idea whether it had gone beyond the fan house.

Sir Andrew: "In my view you did everything a sensible practical man would do in the circumstances."

Colliery engineers and an electrician gave evidence about trouble with the booster fan over a long period—including a fire affecting the belt about six years before. Mr. Daniel O'Connor (43), nightshift engineer, reported the belt to be ruined, and was told by the chief engineer that it was a new one put on only two days previously. "I replied: 'I don't care, it needs another one'," Mr. O'Connor said. After the disaster he discovered that the belt had been cut on more than one occasion. He agreed with Mr. Moffat that the amount cut off in so short a time was "unprecedented" so far as he was concerned.

Mr. William Black (29), electrician, Mr. Matthew Barr (35), engineer, and Mr. David McAulay (58), also an engineer, all told how they had worked on defects on the fan—the belt was slipping—during the two days immediately before the disaster and at earlier periods. Mr. McAulay who fitted the new belt two days before the fire said that the fan had been idle under repair for long periods over the two days and as the disaster occurred he was going underground to fit another new belt. There was considerable oil in front of the fan, the accumulation of years. He agreed with Mr. Moffat that if the fan required at least one pint of oil a day it would be excessive and that missing blades would put the fan out of balance.

The three men each told Mr. Moffat of the procedure for signing the statutory book of reports on inspection and maintenance. The initials which were appended to reports concerning the fan were shown to the engineers who all said that they had not written their own initials. After Mr. O'Connor and Mr. Barr had made similar replies in turn, Mr. McAulay said to Mr. Moffat: "They were neither done by me nor with my authority."

Further evidence was given on Wednesday of trouble with the fan belt by Mr. Thomas Bone (26), mechanical engineer. Mr. George Buchanan (36), a stripper, helped to tackle the fire. He was told by a safety officer to go to the pit bottom where the officer said there were about 20 hoses. When he reached the pit bottom after 25 minutes' walk through the workings, there were no hoses to be found. He went to the surface where he was given hoses that had arrived by lorry, he said.

A deputy, Mr. Michael Mcfarlane Lynch (47), said on the day of the disaster there were two fire extinguishers available, but they had either been discharged before or had been tampered with. There had been a lot of such interference at the colliery. At one time extinguishers were all over the place, but every weekend one or two were discharged. Once parts of an extinguisher had been cut off and removed. Later it was decided to withdraw them from the pit.

Mr. Thomas Green (51), a stone worker and the only man to escape from the bogie train, said that when he went down the pit he sat in the rear section of the last of the bogies. He noticed "a kind of smoke and a slight smell of burning." The atmosphere got thicker and at the terminus it was "just a blanket." At some point he managed to get off the bogies, "how or why I don't know," he said. He made a strenuous effort to get to fresh air, but did not know how he got there.

Modern Construction Equipment for India

IN association with the Walchand group of Indian industrialists, Acrow (Engineers), Limited, London, W.2, has formed Acrow India (Private), Limited, which will shortly begin production of the full range of Acrow steel formwork, scaffolding, and other construction equipment in a large plant at Bombay.

There is said to be a great potential market in India for such products.

MINISTER OF POWER IN YORKSHIRE

Mr. Wood Goes Underground at Manvers Main

VISIT of Mr. Richard Wood this week to the Yorkshire coalfield was his first since his appointment as Minister of Power. The three-day tour started on Monday. The Minister met members of the North-Eastern Divisional Coal Board at the Doncaster headquarters before going underground at Manvers Main Colliery, Wath-on-Dearne, where he visited the North-East District of the Haigh Moor Seam. Mr. Wood had not previously been underground. He was accompanied by Mr. W. H. Sales, chairman of the North-Eastern Divisional Coal Board. After a tour of inspection of the Manvers Central Coal Preparation Plant Mr. Wood met management and union officials at the Manvers Training Centre.

The Minister spent the second day of his tour at the Ministry's Safety in Mines Research Establishment, which has laboratories at Sheffield and a field station at Harpur Hill, Buxton. On Wednesday Mr. Wood's itinerary included visits to the Scarcroft headquarters of the Yorkshire Electricity Board, the Central Electricity Generating Board's grid control centre at Becca Hall, and the headquarters of the North Eastern Gas Board.

Manvers Main Colliery was sunk in 1868. During the intervening years it has produced approximately 65,000,000 saleable tons from the Barnsley Seam (now exhausted) and from the present working seams, Haigh Moor, Parkgate, and Silkstone. The reserves at the current output are expected to last 58 years. In April, 1949, a scheme was approved by the NCB to centralize winding the Wath Main, Kilnhurst, and Manvers Main outputs, to two skipwinding shafts, operating from two horizons at Manvers Main Colliery. The upper horizon at a depth of 343 yds. (No. 2 Pit) deals with the output from Wath Main Colliery and Manvers Haigh Moor Seam, while the lower horizon at 644 yds. (No. 3 Pit) raises the Manvers Silkstone and Parkgate outputs, together with the Kilnhurst output.

Coal Preparation Plant

Modern diesel locomotive haulages are used to haul the coal from Kilnhurst and Wath collieries to the Manvers Nos. 2 and 3 shafts. The Manvers output is collected from three loading stations by similar arrangements. These two shafts will eventually raise 8,400 saleable tons per day, but the highest daily saleable output achieved to date is 8,160 tons.

The scheme also comprises a Central Coal Preparation Plant, which, in addition to the above output, deals with the output from Barnburgh Main, a large colliery producing 4,000 tons per day, which is being developed to 4,500 tons per day. This output is now transported by NCB surface rail-road to the Central Coal Preparation Plant in 24½-ton wagons owned by the board. The plant capacity is in the region of 1,320 tons per hour and can deal with 15,000 tons per day.

The Haigh Moor Seam at Manvers Main is a highly productive seam, 4 ft. 3 in. thick, and worked by conventional methods of machine-cut longwall faces, hand filled on to face conveyors. Gate conveyors and main trunk conveyors deliver the output to two main loading stations from where the diesel locomotives haul the 6-ton drop-bottom mine cars to the pit-bottom discharge station. The coal is discharged into a skip bunker and then loaded into a 6-ton skip simultaneously with the discharge of the other skip at the surface. At the No. 2 shaft a total wind of 6 tons of coal is accomplished in 60 seconds, of which 10 seconds is taken up in the loading and discharging of the skips. This gives a shaft capacity of 360 tons per hour. The No. 3 shaft, which winds from the lower horizon, takes 80 seconds for a total wind of 8 tons of coal, again giving a winding capacity of 360 tons per hour.

In 1947, prior to reconstruction, Manvers Main output and o.m.s. were:—Saleable tons per day, 2,655; coal face o.m.s., 79.1 cwt.; all employed o.m.s., 24.4 cwt. Corresponding figures in 1959 were:—3,431; 81.9 cwt., and 31.6 cwt.

Seam productivity last year for the Haigh Moor, Parkgate, and Silkstone seams was:—Saleable tons per day, 1,923,531, and 977; coal face o.m.s. (cwt.), 98.3, 52.8, and 79.7; all employed o.m.s. (cwt.), 40.3, 22.1, and 26.8. The increase in overall o.m.s. of 7.2 cwt. is due principally to the reduction in surface labour and other non-productive underground labour as a result of the reconstruction scheme.

Simon-Carves Coke Ovens for RTB Strip Mill

COKE ovens and by-product plant of the new hot strip mill to be built at the Spencer Works, Newport (Mon), of Richard Thomas & Baldwins, Limited, is to be supplied by Simon-Carves, Limited, Cheadle Heath, Stockport. Value of the contract is approximately £3,750,000.

The plant will comprise 140 ovens capable of carbonizing approximately 2,860 tons of dry coal per day, together with a by-product plant to recover tar and crude benzole and to produce sulphate of ammonia.

Work on the site is expected to begin early this year. The first stage of the plant will be in production in September, 1961, and the remainder will go into production a month later. The contract is one of the largest placed for coke ovens in Britain within recent years.

SPEAKING AT the company's annual meeting in Nottingham, Mr. George Wilson, chairman of Raleigh Industries, Limited, said that the problem of maintaining steel supplies remained, though there had been a slight improvement in deliveries.

Obituary

MR. JOHN FINDLAY

SON of a sheep farmer and a man who became a leading figure in the Scottish steel trade, Mr. John Findlay died on Saturday at the age of 70. Less than a month before his death he had been elected chairman of the Steel Stockholders' Association.

Mr. Findlay was chairman of the Premier Lamp & Engineering Company, Limited, Leeds, and managing director of Barnes & Bell, Limited, the Glasgow iron, steel, and machinery merchants, mill and mine furnishers, etc., with which he had been associated for 50 years. He was a past-president of the Iron and Steel Trade Benevolent Association. Mr. Findlay was a Justice of the Peace.

Mr. DAVID J. DANIEL, a former colliery manager, died at Ammanford (Carmarthenshire), on Monday.

Senior partner in the agricultural engineering firm of A. & W. Pollock, Mauchline (Ayrshire), Mr. ANDREW POLLOCK, died on Sunday at the age of 72.

Joint managing director of Thomas H. Hill & Sons, Limited, sheet-metal workers, of Kidderminster, until its sale in 1953, Mr. ALLAN JOHN HILL has died at the age of 70.

Mr. HERBERT ROTHBARTH, a director of the Amalgamated Limestone Corporation, Limited, and other companies, was killed in a road accident on Wednesday. He was 75.

Mr. WILLIAM WEBB, who has died at the age of 65, was a director of J. S. Akroyd & Webb, Limited, heating engineers, etc., of Halifax. He was formerly a member of Halifax Town Council.

Mr. FREDERICK WALTER CLAYTON, a former director of Spear & Jackson, Limited, manufacturers of special steels, hand and machine saws, garden tools, etc., of Sheffield, died on Tuesday of last week at the age of 95.

Mr. WILLIAM DIXON, a senior partner in Merz & McLellan, Newcastle-upon-Tyne consulting engineers, has died at the age of 71. Before joining the firm in 1911 as a junior engineer, he served an apprenticeship with C. A. Parsons & Company, Limited, Newcastle-upon-Tyne.

Mr. RALPH G. SILLARS, a former director of Warner & Company, Limited, makers of refined pig-iron, of Cargo Fleet, Middlesbrough, has died at the age of 63. He retired from Warner & Company 20 years ago. During the last war he served in the Scrap Control section of the Ministry of Supply.

A director of the Otley (Yorks) printers' engineers, Dawson, Payne & Elliott, Limited, Mr. ROLAND PAYNE, died on Thursday of last week at the age of 75. Mr. Payne was the grandson of David Payne, inventor of the Wharfedale printing press on which the Otley engineering industry was founded.

Formerly for some 25 years manager of Harworth Colliery (Notts), Mr. WILLIAM WRIGHT died on Wednesday of last week. He went to Harworth as manager when the colliery was first opened and from 1943 until his retirement from the industry in 1948 he was agent there. On his retirement he had spent 58 years in the industry.

Mr. JOHN HENRY BIRKITT NORTH, founder and senior director of the agricultural implement, tool, and tractor firm of J. H. B. North & Son, Limited, Stamford, died on Wednesday of last week at the age of 89. He was for 33 years with Blackstone & Company, Limited, manufacturers of diesel engines, electrical generating sets, etc., of Stamford, and commenced business on his own in 1921. For a number of years his only son, Mr. Jack North, has been engaged in the business.

Mr. GEORGE THOMAS WHITEHOUSE, chairman and joint managing director of the Metal Products Company (Willenhall), Limited, Willenhall (Staffs), died last Friday at the age of 77. He was also chairman and a director of the Willenhall Metal Reclamation Company, Willenhall, and of the Honeybourne Brick & Tile Company.

The death has occurred of Mr. DONALD H. FINER, deputy chairman and joint managing director of Constructors, Limited, manufacturers of steel office furniture, factory and storage equipment, etc., of Birmingham. He was also a director of A. W. Chapman, Limited, manufacturers of adjustable seat mechanisms, of London, S.W.6, Pratt Bros., Limited, sheet-metal workers, etc., of Birmingham, and a number of other companies.

The first working miner to become a magistrate in Staffordshire, Mr. JOHN HENRY DUNKEY, who was appointed a county magistrate in 1937, died on Saturday at the age of 70. He started work at the age of 14 at Holly Bank Colliery and also worked at Sneyd and Hilton Main collieries before being appointed a Ministry of Fuel and Power investigation officer in 1942. In 1947 he became assistant labour officer for the Cannock Chase Area of the West Midlands Divisional Coal Board. He retired in 1958. Mr. Dunkey was a former chairman of the Midland Miners' Federation Executive and a member of the Old Pelsall District Miners' Association all his working life.

US Tractor Company Forms UK Subsidiary

FORMATION is announced of the J. I. Case Company, Limited, as a £1,000,000 British subsidiary of the J. I. Case Company of America, which has been in existence for over 100 years and has become one of the world's leading manufacturers of tractors. Its present annual turnover exceeds £70,000,000 ($200,000,000) and its index of expansion shows it to be "the fastest growing tractor line in the world."

Initially, British operations will comprise eight basic models for industrial and constructional use—crawler tractors and dozers up to 100 h.p., shovels up to 2 cub. yds. wheeled loaders from 35 h.p. to 120 h.p. also with a capacity up to 2¼ cub. yds. A complete range of ancillary equipment will be available.

The J. I. Case Company, Limited, will not only be responsible for manufacturing, sales, and distribution in the UK, but also sales to Europe, the Middle East, India, Pakistan, Africa, and other Commonwealth countries. At the company's London administrative headquarters there will be showrooms, repair parts stock, and servicing facilities. Sales and service centres will eventually be opened in the Midlands and Scotland.

The board of J. I. Case Company, Limited, has Mr. John J. Hutchins as chairman and Mr. W. Muir Robb as managing director. It includes Mr. George H. Thomas, who was formerly associated with the Massey Harris group. Mr. John P. Featherstone, formerly a director of Road Machines (Drayton), Limited, has been appointed director of domestic sales and service.

Operational Experiences with a STEEL-TUBE RECUPERATOR

A conference was held in Paris last April to discuss steel recuperators, heaters, and heat exchangers and their use in industry. The conference, which was attended by representatives from many countries, was arranged by four companies: Metallurgical Engineers, Limited, London; SETREM, Paris; Rekuperator KG, Dr.-Ing. Schack & Company, Düsseldorf; and Griscom-Russell-Schack Company, Incorporated, Pittsburgh. Eight papers were presented, and we summarize a German contribution by Dr.-Ing. H. Rheinfeld.

THERE are two fundamental ways in which the blast for a smelting furnace, *e.g.*, a blast furnace, can be heated. The most popular method of blast heating, necessary to maintain the temperature for the reduction process is the well-known Cowper stove. In this system, it is necessary to have at least two heaters in operation, since both units operate alternately on gas and air.

This operating method naturally causes fluctuation of the hot-air temperature at the furnace. The temperature which can initially be obtained drops during the course of the blowing period and is raised again to its original value after reversing to the heater which has, in the meantime, been on gas.

Already some decades ago, consideration was given to a different system of blast heating, whereby a completely uniform hot air temperature could be obtained. The suitable tool for this method was the steel-tube recuperator, which had already been developed around 1932 for pusher furnaces in rolling mills.

In 1933 the Röchling Iron and Steel Works considered a scheme to build a modern blast-furnace air heater of the new design. The principle of such a steel-tube air heater consists of passing the cold blowing air through a large number of suspended small diameter tubes which are combined in tube banks. This flow is from top to bottom. The hot flue gases pass upward, but around the tubes, and heat the cold air flowing in the opposite direction in their passage through the heater.

This apparently attractive and simple process, which depends on the convection and radiation from the hot-gas stream to the blast air, did raise, in the beginning, considerable difficulties. Unlike the conventional blast stove which operates with a refractory checker chamber, the steel-tube air heater is composed of tubes which are made of scale-resisting and highly heat-resisting steel with sufficient creep resistance. These tubes must remain undeformed, even after several years' continuous use under conditions of the flue gas temperature and an internal pressure of 1 atmosphere.

The Röchling Installation

In 1937, Rekuperator KG, of Düsseldorf, built such a steel-tube air heater for the Röchling'schen Iron and Steel Works in Völklingen. The most important design and operating data were briefly as follows: Total weight, 35 tons, of which steel weight was 20 tons. The main heating surface was 19,000 sq. ft., and auxiliary heating surface, 377 sq. ft. No. of tubes in the main bank was 1,320, and in the auxiliary heating surface, 64. Tube length of the main bank was 43 ft. 3 in.; guaranteed blast volume, 31,200 cub. ft./min.; guaranteed air temperature, 750 deg. C.; and pressure loss of the blast in the air heater, 16 in. w.g.

The air heater was equipped on each side of the main tube bank with a combustion chamber. Immediately before the entry of the flue gases into the three main banks, a tube curtain (auxiliary heating surface) was arranged, through which an additional volume of cold air was passed. These auxiliary surfaces were intended to protect the main tube bank from impact of the flue gases entering at full temperature. Because of ease of replacement, this would protect the more valuable main bank.

These auxiliary surfaces, which pre-heated from 8-10 per cent. of the total blast volume to about 800 deg. C., cooled the flue gases by about 80 deg. C. The tubes in the main banks had an average outer diameter of 1.4 in. with a wall thickness of about 0.09 in. Owing to the brittle nature of some heat resisting steels, the 43-ft. 3-in. long tubes were composed of four different steel qualities, first high-grade chrome nickel steel, to which were joined highly alloyed chromium steel, low alloyed chromium steel and, finally, normal unalloyed carbon steel, in that order.

Because of the appreciable expansion of the tubes in the main banks, the hot-air manifolds are anchored firmly in the recuperator shell, while the cold-air collector is pulled upwards by means of a lever and counter-weight system. The even tension produced thereby prevents a collapse of the tube which would occur at the high temperature by its own weight alone.

The uniformity of the hot air temperature was surprising for those days; although the use of such recuperators was already known for re-heating furnaces, the steel-tube heater did represent a completely new development for the Völklingen blast furnace. The blast furnace was reported to operate better than all the others, probably because of the

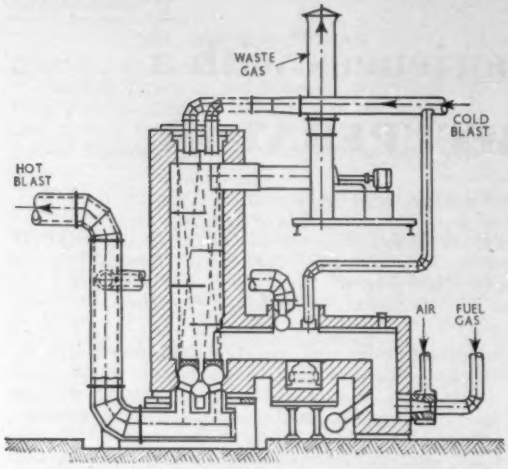


FIG. 1.—SCHEMATIC DIAGRAM OF THE TROISDORF BLAST HEATER.

constancy of the conditions and the easy regulation.

The Röchling air heater remained in service until it was finally dismantled during the war year 1944.

Following this air heater, a further heater of similar construction was built at the Königshütte in Upper Silesia. The results from this heater were not as promising as those in Völklingen, the main reason being the sulphur attack on the tubes, with subsequent corrosion, effects which could have been avoided if they had been known.

Installation at Troisdorf

The development of steel-tube air heaters for blast furnaces lay dormant for a number of years but, in 1956, Rekuperator KG, Düsseldorf, offered to construct such a heater for a low-shaft furnace to be built within the Klöckner-Mannstaedt Works at Troisdorf. From experience already gathered with heaters of this construction, a blast-furnace heater was designed, using the principle which had remained unaltered for about 25 years, but with a few innovations which have led to very satisfactory operation.

This recuperator, built for a 100-ton low-shaft furnace, is a direct-fired heater with a steel tube system, around which the hot flue gases flow, guided by baffle plates. The air to be pre-heated flows with high velocity through the tubes and gives a low wall temperature of the tubes, thereby increasing their life.

A schematic diagram of the Troisdorf blast heater is given in Fig. 1. Because of the large heating surface and the high transfer coefficients, a high thermal efficiency is obtainable even in such a large unit. In this case, too, a pre-recuperator is installed before the main recuperator, but this pre-recuperator is substantially larger than the Röchling plant and is operating in parallel flow.

This means that the cold air is admitted at a point where the temperatures of the flue gases are at their highest, *i.e.*, immediately after the burners. Thereby, the wall temperature of the pre-recuperator is considerably reduced and the main tube bank is protected from over-heating by direct radiation from the combustion chamber. As already noted in the Völklingen example, the pre-recuperator (which corresponds with the auxiliary heating surface of the earlier project) is intended to pre-heat an appreciable part of the total blast volume in constant operation to 800 deg. C. It is necessary in this design that the gas used for firing the heater must have a high degree of cleanliness.

If dust-containing gases are used, the dust deposits on the tube banks to such an extent that cleaning of the banks cannot be guaranteed during continuous operation.

The steel-tube air heater for the low-shaft furnace has been designed for a capacity of 14,700 cub. ft./min. to 800 deg. C. in continuous operation. The technical data were as follow:

Heat consumption of the air heater for a pre-heat of 800 deg. C., 28.4×10^6 BTh.U/hr.; fuel consumption with a heating gas of 151 BTh.U/cub. ft., 2,940 cub. ft./min.; total volume of blast pre-heated, 14,700 cub. ft./min., of which 80 per cent. was in the main bank and 20 per cent. in the pre-recuperator.

The scheme of operation of the steel-tube recuperator is as follows:

A gas/air mixture is burnt in the combustion chamber and first flows through the tube bank of the pre-recuperator; subsequently, it passes into the bottom end of the main recuperator. The waste gases are removed at the top end of the main recuperator.

The cold blast from the blowers is divided into two streams, 20 per cent. to the pre-recuperator and 80 per cent. to the main recuperator. The part of the blast heated in the pre-recuperator by-passes the main recuperator and is directly passed into the hot air main. The part of the blast which passes through the main recuperator flows in a vertical direction from top to bottom in counterflow to the flue gases and then re-joins the blast pre-heated in the pre-recuperator. The air distribution between main and pre-recuperator is carried out by the introduction of butterfly valves in the cold-air mains.

A by-pass main is provided from the cold-air collector main to the hot-air main in order to adjust the final blast temperature. The regulation of pressure in the pre- and main recuperators is carried out mainly by the two butterfly valves in the waste gas main.

It is also possible to introduce cooling or secondary air through a special main from the combustion air fan into the combustion chamber.

Three main instruments are provided for the control of the recuperator operation:

(1) The air/gas ratio controller adjusts the required gas/air mixture for the burners. Normally, the burners operate with 20 per cent. excess air.

(2) The combustion chamber temperature controller is used for maintaining the temperature in the combustion chamber at 1,100 deg. C. Variation of this temperature is compensated by the controller, which introduces the necessary quantity of cooling air into the combustion chamber.

(3) The hot-blast temperature controller maintains the temperature of the blast at the constant value required by the operators. Furthermore, the controller is required to attain any desired blast temperature as quickly as possible by means of alteration of the combustion gas quantity and the requisite amount of combustion air. When the desired temperature is raised by movement of the pointer of the blast temperature regulator, the butterfly valve in the combustion air main is opened. The gas quantity is increased proportionately to the increased air quantity by means of the mixture controller.

The maximum permissible hot-blast temperature from the air heater must not exceed 820 deg. C.

(4) The butterfly valves are adjusted to pass a minimum blast quantity of 118 cub. ft./min., in addition, there is an appropriate combustion air volume. The butterfly valves close if there is failure of either the cold blast or the combustion air because of failure of the ratio controller, the main blower, or the valve for the combustion air.

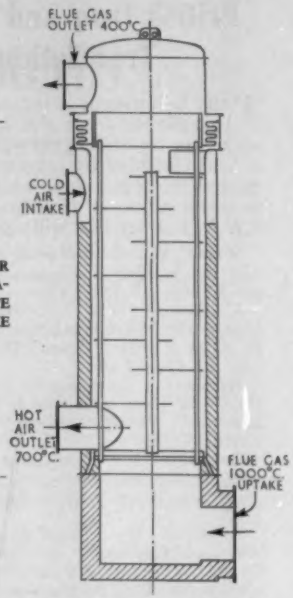


FIG. 2. — RECUPERATOR DEVELOPED BY REKUPERATOR KG, OF THE TYPE "FLUE GAS THROUGH THE TUBES."

Operational Experience at Troisdorf

The heater was commissioned in September, 1957. At first, the hot air temperature at which the heater was operated was 500—600 deg. C. but gradually this temperature was increased to 700 deg. C., since the low-shaft furnace was worked at this temperature for several weeks. For short periods, hot air temperatures of 800 deg. C. were maintained and these were obtained without difficulty by the recuperator.

During the 3½ months which the heater operated in 1957, it functioned without any difficulty worth mentioning. Minor troubles at the burner ports, which were probably caused by unsatisfactory brickwork, could be repaired at the works very quickly.

Certain understandable irregularities occurred in the automatic control gear, but these were traced to incorrect setting of butterfly valves. After these sources of error were recognized at an early stage, no detrimental effects were felt in the operation of the recuperator.

Since the furnace operation depends on the hot blast temperature, continuous operation at 800 deg. C. blast temperature could not yet be carried out. Experience gathered so far permits the conclusion that these temperatures can be maintained in continuous operation.

After blowing out of the furnace plant at the end of 1957, because of reconstruction of part of the blast furnace, the recuperator was also taken out of commission and examined thoroughly. No noticeable damage could be recognized. The small faults observed during the operating period at the burner ports could be properly repaired. A check on the tube bank in the pre-recuperator and the main recuperator did not show any deposits or distortion of the tubes.

It was, however, decided to fit some baffle walls in the combustion chamber of the pre-recuperator to protect the elements from the main impact of the hot flue gases.

Conclusions

The Schack design of steel-tube air heater is a reliable unit which is capable of giving uniform hot blast temperatures to the associated shaft furnace (blast furnace or low-shaft furnace) at temperatures which can be maintained without fluctuation. The hot-air volume demanded for the low-shaft furnace plant at Troisdorf can be attained without difficulty.

Although there is no experience with continuous operation at temperatures of 800 deg. C., this temperature should be attainable during continuous operation.

Pneumoconiosis in Coal Mining

A Digest of Statistics, 1958, relating to pneumoconiosis in the mining and quarrying industries has been issued by the Ministry of Power (HM Stationery Office, price 3s. 6d.). Applications dealt with and certifications of death from silicosis or pneumoconiosis in the coal mining industry dealt with during 1958 in connection with compensation or benefit schemes under the Workmen's Compensation Acts, 1925-45, were 363 and 262 respectively. No partial or total disablement cases were certified. Pneumoconiosis deaths in coal mining relative to death benefit awards under (1) the National Insurance (Industrial Injuries) Acts, and (2) the Pneumoconiosis and Byssinosis Benefit Scheme in 1957 were 428 and 347 respectively. The figures relate only to cases where death was caused or materially accelerated by pneumoconiosis and death benefit was paid. Not all deaths due to the disease, it is pointed out, give rise to claims for death benefit.

British Iron and Steel Industry Translation Service

THE following is a list of some new translations available from the Iron and Steel Institute under its translation service scheme. Translations are all classified by numbers, and these should be quoted on application, which should be addressed to the institute at 4, Grosvenor Gardens, London, S.W.1. Further lists will appear from time to time.

WEISZ, M.: *Contribution to the Physical Investigation of Fatigue Damage.* "Rev. Mét," 1959, Jan., pp. 83-103. £8 15s.—1264.

KRISTOE, G., et al.: *The Development of a Weldable Manganese-Titanium-Aluminium Alloyed Steel Quality St. 52 in Hungary.* "Neue Hütte," 1958, July, pp. 425-432. £5 15s.—1291.

BRAND, L.: *Comparative Investigation of Defects in Heavy Forgings by means of Ultrasonic Waves and the Betatron.* "Stahl u. Eisen," 1959, Jan. 8, pp. 32-36. £3 10s.—1309.

KRACHTER, H.: *Experience with a 15-MeV-Betatron used for the Non-destructive Testing of Steel Products.* "Stahl u. Eisen," 1959, Apr. 2, pp. 419-426. £5—1312.

HUSER, K. H.: *Critical Consideration of Mechanization and Automation in Steel Production.* "Stahl u. Eisen," 1959, Jan. 22, pp. 65-73. £6 10s.—1313.

PFEIFFER, I.: *The Various Effects of Vacuum Melting on the Gas Content of Metals.* "Z. Metallk," 1958, Sept., pp. 455-460. £2 10s.—1317.

ZIDEK, M., and B. GLATZ: *Hot Rolling of Thick Steel Plate Clad on One Side with Stainless Steel.* "Hutnické Listy," 1958, Aug., pp. 679-687. £7—1329.

PLYATSKOVSKII, O. A., and G. P. PISHCHIKOV: *Preventing the Occurence of Premature Cavitation in the Piercing of High-alloy Steels.* "Stal," 1952, Apr., pp. 330-336. £5 10s.—1364.

LEIRIS, H. DE, and E. FRAPPIER: *The Relation Between the Distance of an Inclusion from the Surface and its Effect on Fatigue Cracking.* "Rev. Met.," 1959 (1), pp. 11-24. £6.—1263.

ELFMARK, J.: *The Life of Forging Dies.* "Hutn. Listy," 1958 (7), pp. 612-619. £8 10s.—1346.

KOPINECK, H. J., et al.: *Ultrasonic Testing of Products in the Iron and Steel Industry.* "Stahl u. Eisen," 1959, May 28, pp. 786-797. £2 5s.—1365A. (See also *Continuous Ultrasonic Testing of Products of the Iron and Steel Industry*—1365.)

CLERBOIS, L., et al.: *Intercrystalline Corrosion of Austenitic Stainless Steels* (with discussion). "Electrochimica Acta," 1959, Apr., pp. 70-81. £3 15s.—1388.

SCHREIBER, W.: *Oxygen in Open-hearth Furnaces. Data from reports and practice. II—A Comparison and Evaluation of Oxygen Steelmaking Processes.* "Radex Rund.," 1959, May, pp. 546-555. £5.—1396.

SERKOVSKII, V. A.: *Influence of Vibrations on Metal Properties.* "Lit. Proizv.," 1958 (5), pp. 19-21. £3 15s.—1415.

SCHINN, R.: *High Temperature 12 per cent. Chromium Cast Steel.* "VGB, Mitt.," 1958, Dec., pp. 397-406. £4 5s.—1421.

RAHMEL, A., et al.: *The Oxidation of Iron-molybdenum alloys in air at Elevated Temperatures.* "Arch. Eisenhütt.," 1959, June, pp. 351-360. £7.—1465.

BERG, S. *Stress corrosion.* "Teknisk Ukeblad" (Oslo), 1958, Apr. 10, pp. 323-331. £5 5s.—1479.

PLOGER, U.: *Development and Application of a Heat Radiation Measuring Instrument for the Analytical Evaluation of Temperature Conditions.* "Arch. Eisenhütt.," 1959, Aug., pp. 473-476. £3 5s.—1463.

HOFMANN, E. E.: *Viscous behaviour of Synthetic Slags in dependence on their Composition and Temperature* (with discussion). "Stahl u. Eisen," 1959, June 11, pp. 846-854. £5.—1471.

PLETTINGER, E., and F. PICCINELLI.: *Use of Chrome-magnesite bricks in combination with Prefabricated Dolomite Blocks.* "Atti Notizie," 1959 (1), pp. 17-19. £2 5s.—1475.

GROSSFUSS, E.: *Determination of Oxygen in Steel using different test methods.* "Neue Hütte," 1958, Oct., pp. 608-615. £4 15s.—1487.

PLUSQUELLEC, J., et al: *The Influence of Charging Times and Storage at Room Temperature on the Hydrogen Embrittlement of Steels.* "Compt. Rend," 1958, June 23, pp. 3454-3457. £1 15s.—1427.

MEDOVAR, B. U. and S. M. GUREVICH: *Oxygen-free Fluxes for Welding High-alloy Steels and Alloys.* "Avtom. Svarka," 1955 (4), pp. 31-41. £4 5s.—1335.

WYSS, U.: *The Influence of Primary Band Spacing and the Austenitic Grain Size on the Formation of the Ferrite-pearlite Banded Structure.* "Schweizer Archiv," 1956, Aug., pp. 258-260. £2 15s.—1379.

DRILLER, A.: *The Development of Arc Steelmaking Furnaces and of Electrode Control Mechanism.* "Elektrotechn. Z.," 1956, Feb. 21, pp. 41-47. £4 5s.—1433.

THOMAS, L.: *Steel for Reinforced Concrete.*—I. "Tek. Uke.," 1958, Nov. 20, pp. 1011-1018. £4 15s.—1435.

BAHN, R., and K. PUMP: *Examination of a Simple Measuring Procedure for the Determination of the Spalling Resistance.* "Silikat Technik," 1959, Apr., pp. 190-192. £2 15s.—1483.

PETIT, J.: *The Fabrication of Large Diameter Welded Tubes at the Sedan Factory of the Société Lorraine-Escaut.* "Techn. Moderne," 1959, Apr., pp. 197-206. £6.—1460.

Calendars, etc., Received

ON receiving the following calendars, etc., for 1960, we wish to convey our thanks, and to extend our best wishes for the New Year to the senders.

UNITED STATES STEEL EXPORT COMPANY, London, E.C.4—Wall calendar.

D. S. BADDELEY ENGINEERING COMPANY, LIMITED, Glasgow, C.3—Seasonal greetings card.

UNITED ENGINEERING & FOUNDRY COMPANY, Pittsburgh, Pennsylvania, US—Office wall calendars.

BRITISH OXYGEN GASES, LIMITED (INDUSTRIAL DIVISION), London, S.W.1—Spiral-backed weekly desk calendar.

DOLLERY & PALMER, LIMITED, London, S.W.1—Wall calendar illustrated by 12 items of mining equipment supplied by the company.

ALUMINIUM DEVELOPMENT ASSOCIATION, London, W.1—Christmas card illustrated with detail from "Adoration of the Magi," by Isenbrandt.

ASSOCIATED ELECTRICAL INDUSTRIES, LIMITED, London, W.C.2—Wall calendar, with 12 reproductions of colour transparencies taken by employees of the company.

MINING ENGINEERING COMPANY, LIMITED, Worcester—Pocket diary and spiral-bound desk diary, together with a wall-calendar and greeting card, illustrated by views of West Malvern and Worcester Cathedral, respectively.

SURFACE MANPOWER AT MINES

Labour-saving Measures in Yorkshire

By S. C. WALKER, A.M.I.Mech.E.*

In many cases the cheapest labour-saving device gives the greatest return. The application of such devices, both large and small, are described in this paper, presented to the Yorkshire Branch of the National Association of Colliery Managers, on March 10, 1959. Particular reference is made to increasing efficiency in No. 8 (Castleford) Area, as the result of the introduction of relatively small-scale plant.

INDUSTRIAL executives, in these days of economic stress, are paying increased attention to any measures that will reduce the manufacturing cost of their products. This is not confined to the mining industry, but is a national problem. The continued industrial development of many countries, combined with the tremendous increase in productivity of countries devastated during the war, have resulted in increased sales competition.

The national standard of living can only be maintained by increased production, which is, however, by itself insufficient; we must have increased productivity combined with lower costs. Certain basic industries such as steel, coal, electricity, and gas, should be in the forefront of this economic drive, in so far that the price of their products influences to such a tremendous degree, the costs of all materials produced by the use of any of these services. In turn, the production costs of steel, electricity and gas, are in the main all dependent upon the supply of adequate quantities of the right grade of coal at an economic price. Thus those in the mining industry are morally bound to do all within their power to reduce costs to help in this national effort.

Many of the points covered in this paper are from No. 8 (Castleford) Area, North-Eastern Division, National Coal Board, which consists of 16 collieries in production and Kellingley Colliery, a new sinking.

Pit-top Circuits

It is a truism that in many cases the cheapest labour-saving device gives the greatest return. It is imperative that each and every surface operation should be analyzed with a view to determining whether or not it is possible to introduce some simple device or make some small adjustment that will lead to a saving in manpower. Often, the savings of re-grading track result in the saving of manshifts. Much work has already been done in this way: at one colliery a simple re-grading and re-routing resulted in a saving of six men. At Whitwood Haigh Moor Colliery a fairly simple reorganization carried out by colliery labour using materials made up in the shops reduced the manpower requirement from 10 men per shift to two per shift. We should all be increasingly conscious of the fact that we have not as yet reached the optimum.

The ideal in any pit-tub or mine-car circuit should be to move the conveyance the minimum possible distance. An interesting application of the short-circuit type of layout is that installed at Savile Colliery. The scheme is designed to wind 2-ton mine cars from a depth of 260 yd., winding one car per cage (Fig. 1). The cage is decked in the normal way and proved "in line." The pneumatic rams then propel the empty forward, striking the car release catch automatically. The full car then travels forward on to the "twin-entry" turntable from which it is fed *via* a Lofco creeper to the tippler, again automatically striking the car

FIG. 1.—DECKING 2-TON MINE CARS AT SAVILE COLLIERY.

* Chief Engineer, No. 8 (Castleford) Area, North-Eastern Division, National Coal Board.

catch and propelling out the empty car standing in the tippler.

The empty car then travels to the empties turntable which is of the "twin-exit" type which are ideal when space is restricted on the empties side of pit top mine-car circuits. The turntable continuously rotates with no fixed rails on the deck in a similar manner to the single-track "Peake" turntable, but unlike the latter the running-on track is in well boards from the periphery of the deck, and from a point midway round the table cars can run on either of two diverging tracks. A coned deck is used so that both running-off tracks are on a down gradient from the point where the track diverges thus helping cars to run off the turntable.

A swinging guide arm is used to lead cars on to the desired track, the arm being profiled so that in one position it forms the inner guide of the outer track, and in the alternative position is the outer guide for the inner track. The arm is operated by a pneumatic cylinder and is controlled automatically by trips set alongside the in-going and out-going tracks. From the twin-exit turntable the cars travel to the stops and ram gear ready for the next cycle.

The tippler chute on this particular circuit is fitted with a pneumatically-operated changeover door in order to handle either coal or dirt. By turning cars round a tight radius and eliminating rail turnouts, twin-track turntables can be used to make very short mine-car circuits at the pit top. The plant at Savile Colliery is installed in a heapstead 85 ft. long by 30 ft. wide.

It is not suggested that it is possible to make every pit top conform to these types; they are merely illustrative of certain ideals. A frequent source of manpower wastage is in and around pit tops. With modern tub stops, catch-strikers can be almost eliminated, and with a suitable power-operated ram, the average single-deck pit top should be operated by one person. Often a little attention to the gradients on the entrance and discharging end of creepers can eliminate manpower at these points.

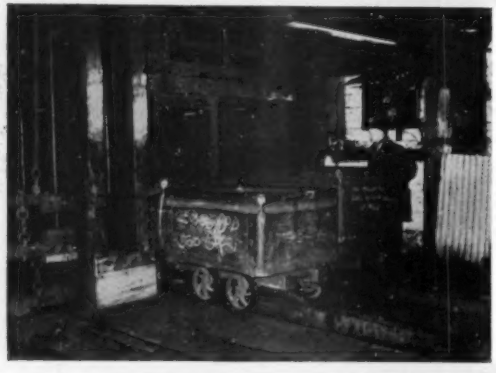


FIG. 2.—SIMULTANEOUS LOADING OF FOUR TUBS PER CAGE AT WATER HAIGH COLLIERY.

Suitable attention has been given to the installation of electrically-operated ram gear. Typical illustrations are those installed at Glass Houghton Colliery, where 30-cwt. mine cars are being rammed singly, and at Water Haigh Colliery (Fig. 2) where four tubs per cage are being rammed simultaneously. These installations have resulted in the saving of four men at each installation. During the 1959 holiday period a further 10 similar sets of rams are being installed.

Coal Preparation

An Area analysis of surface manshifts worked indicates the following proportions: Winding and banking, 13.9 per cent.; traffic, 14.5 per cent.; coal preparation, 17.7 per cent.; power, 6.7 per cent.; maintenance 27.5 per cent., and other surface labour, 19.7 per cent. It is apparent that probably the greatest savings of all are possible in the coal preparation sections. Simple automatic rakes can be installed at very small cost, to spread the coal evenly on to the picking belts, thus saving manpower employed on this duty. and also leading to easier picking. Wherever possible, some means of automatic coal preparation should be installed, preparing the coal up to the maximum possible size. To this end a small, simple washing cone, which can give excellent results in suitable conditions, has been made in the Area workshops.

The plant consists of a steel fabricated truncated cone, about 8 ft. in dia. at the top and 2 ft. dia. at the bottom, with a depth of 6½ ft. A rotating shaft is fixed vertically in the centre of the cone; on this shaft is a heavy cast iron crosshead to which is bolted four cross-arms, which each carry three heavy-steel rods, bent outwards and projecting down so as to almost touch the sides of the cone. On the bottom of the driving shaft are also bolted four shorter arms. The coal passes into the washery from the top launder, then into the centre ring, while water is forced in at the bottom through a perforated plate.

The coal is kept in a continual state of agitation and as it sinks into the bath it is met by an upward current of the water. The coal, lighter in weight than the impurities with which it is associated, is floated upwards and overflows at the weir (Fig. 3). The impurities sink and are collected in the base from which they are extracted by means of a normal dirt elevator. The system is very similar to the Chance washery but without the complications of the sand medium. The shaft with crosshead and arms revolves at the rate of 14 to 15 r.p.m., the clean coal passing from the washery on to the normal classifying de-watering screens.

A single bath installation, made at the Area shops and installed in the existing screen house at Savile Colliery, is capable of dealing with 100 ton/hr. The total cost was approximately £8,400 for the complete installation. A further pair is now being made up for installation at Whitwood Colliery.

Another development is the comprehensive coal preparation plant through which the whole pit

output of both coal and shale is passed. An installation for Fryston Colliery is under active consideration and is designed to deal simultaneously with 250 tons of coal and 200 tons of shale, between the limits of 8-in. by ¼-in. Run-of-mine shale is passed into the plant and that passing over an 8-in. grid is crushed to that size, afterwards joining the minus 8-in. fraction. The coal/shale mixture is then passed over a ¼-in. screen, the under-size being passed directly to the reject belt, the ¼-in. fraction passing into the dense medium.

The run-of-mine coal enters the plant and is screened at 8-in., the over size being hand picked and loaded out *via* a boom loader. The below 8-in. fraction is then screened at ¼-in., the under-size being bunkered and sold dry to either the Central Electricity Generating Board or Glass Houghton coking plant.

The shale is to be conveyed over the river to a bunker situated on the tipping ground and will be tipped by Euclid dump trucks. In this way there will be only two men employed on disposal from the point of leaving the dirt tippler. All the coal will be recovered to ensure that all the shale will be sterile and almost impossible to fire. Two further coal preparation plants for Ackton Hall and Prince of Wales collieries are now being prepared.

Mechanical Handling and Stocking

In no field of coal handling is there the diversity that exists at landsale depots varying from the use of the shovel to highly complex mechanical systems. Each method must be tailored to suit the particular set of circumstances in which the use of the simple drop-bottom wagon is not to be despised.

One system, in use at Primrose Hill Colliery, is designed to deal with smalls, singles, doubles, trebles and miners' concessionary coal. The plant consists of a tippler, a conveyor and bunkers (Fig. 4).

The wagons are marshalled and lowered to a hoist-type side-discharge wagon tippler which is capable of handling 20, 24½-ton wagons per hour. The coal is fed from the bunker *via* a Locker Taylor feeder on to the main conveyor belt. On the level portion of this conveyor over the bunkers, the belt passes through a movable tripper mechanism which houses the conveyor driving drum and motor, and the tripper traversing motor and drive. Power is picked up from a shrouded overhead three-phase track.

The conveyor tripper can be traversed, without stopping the belt, over the desired bunker, into which it can discharge over a system of anti-breakage chutes. Lorries are marshalled off the road on an area of hard standing and are signalled down as required by an illuminated sign mounted on the weigh house roof.

Stocking of coal during summer periods is obviously here to stay and considerable thought should be given to decide the most economic system considering the prevailing condition existing at each colliery. A concreted stocking area or at least a sufficient area of soil, stabilized by modern methods, would ensure almost 100 per cent. recovery, and help the use of mechanical loading using the minimum of manpower.

A system for coal stocking has been designed for use at the new Kellingley Colliery, making full use of landsale facilities. The coal to be stocked will be emptied from wagons by the tippler, from which it will be conveyed into the main bunker, and out of which it will be loaded into some form of lorry or dumper and then tipped in consolidated layers on the stocking ground. It is intended to pick up from these stacks using a rubber-tyred loader such as the Hough Payloader which would enable the coal to be loaded into lorries or railway wagons; the latter could be re-tipped and passed to the canal-side bunker

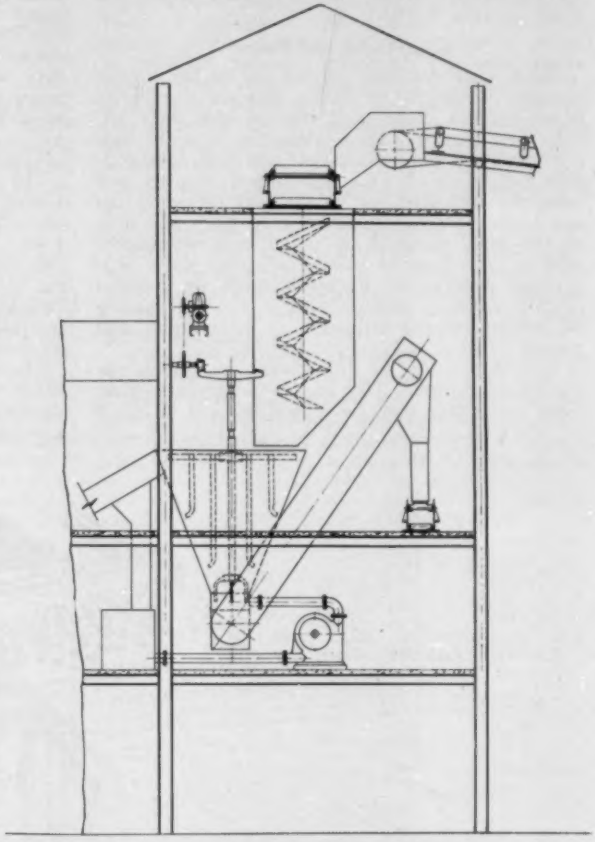


FIG. 3.—WASHING CONE TO HANDLE 100 TON/HR. AT SAVILE COLLIERY.

FIG. 4.—DISPATCHING PLANT AT PRIMROSE HILL COLLIERY.

thus giving complete flexibility of disposal by road, rail or water.

Much manpower is expended in the handling of supplies; a well-organized stockyard laid out to utilize mechanical handling to the maximum possible extent will reduce the manshifts employed in this section. In this respect, much could be learned from steel stockholders' yards, where, almost invariably, there is a well-prepared area underneath an electrically operated overhead travelling crane moved along a steel crane gantry.

In many colliery fitting shops such systems are always installed, and the materials handled are much smaller compared with the quantities handled for pit supplies. Such a scheme has been devised for Kellingley Colliery in which the crane will cover an area of 450 ft. by 100 ft.

Heat, Light, and Power

Much work has been carried out on the modernization of shell boiler plants, and many collieries have installed chain-grate stokers with their ancillary equipment. These measures certainly help in the reduction of manpower and fuel consumption but many boilers and steam winders are aged and will need, during the near future, extensive replacements in order to keep them operative at the high standard of safety now demanded. Serious consideration should be given to a progressive programme of replacement by modern electric winding engines with a resultant saving of manpower and reduction in heat, light, and power costs.

The elimination of compressed air should be vigorously pursued. By such a programme heat, light, and power costs have been lowered in No. 8 Area in spite of increased wage rates, with higher fuel costs and a great increase in the consumption of electricity underground.

During 1958 three winders were commissioned, and during 1959 11 more will be installed. Sound engineering co-ordination can do much to effect a trouble-free changeover. Drawings are agreed and bar charts are prepared for all phases of the operation. These are circulated to parties who are well briefed as to what is expected of them and what help they can receive from other collieries in the Area.

Progress is then closely followed, and at fortnightly intervals engineering meetings are held at the Area headquarters to review progress and make such adjustments to the bar charts as may be found necessary. During the actual changeover such items as pneumatic impact wrenches, electric chain blocks, and lifting frames are borrowed from Area stock, and arrangements for the use of a heavy mobile diesel crane are made. All these items have been found to be of tremendous use and contribute much to ensuring a changeover in minimum time and cost.

The pneumatic impact wrench is capable of dealing with the nuts of 1½-in. dia. bolts, and can normally remove the tightest nut in a matter of 5 sec. It can tighten up in about the same time. The 10-ton capacity electric blocks are attached to the normal crane hook and ensure that all lifting by crane can be carried out by one man without any fatigue. Without the use of these blocks often six men are seconded to this duty alone.

There are in No. 8 Area portable lifting frames, which can be mounted outside the winder house, allowing a lorry to be loaded directly from the

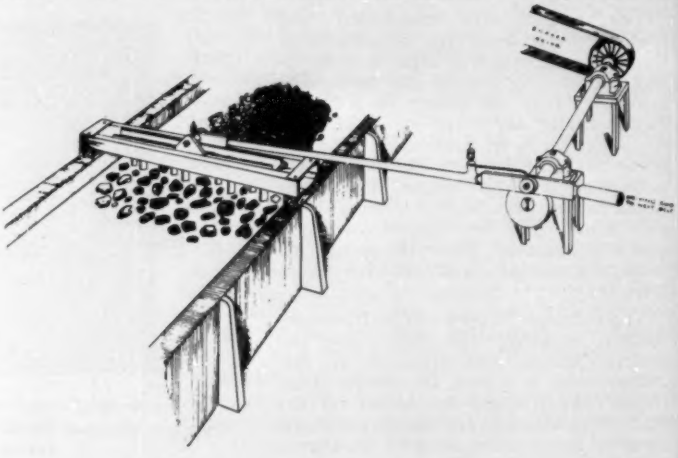


FIG. 5.—AUTOMATIC RAKE FOR EVENLY SPREADING COAL ON PICKING BELTS.

FIG. 6.—TWIN-WHEELED TROLLEY FOR PLACING PLANKS OVER THE PIT TOP.

house, or heavy components to be loaded to the floor and pulled away for removal at a later date. Probably one of the most useful pieces of equipment in the Area is a diesel-electric mobile crane of 20-ton maximum capacity at 10-ft. radius. It has a sectional jib that can be extended to 100 ft., enabling it to lift 6½ tons at 20-ft. radius.

Miscellaneous Equipment

Many excellent ideas have originated from our own workmen. For many years they have been encouraged to submit ideas to the Divisional Awards Panel, helped by suitable engineering drawings which have been prepared for them. Many ideas submitted are excellent, and a description of three of these follows.

Screen picking is still with us and for many years there have been men employed on these belts distributing the feed. The simple device shown in Fig. 5 has completely eliminated these people and also ensured positive, even distribution. The equipment consists simply of a reciprocating frame similar to a machine back saw to which is fitted a comb of looped flexible cutter rope which gently rakes the coal over the full width of the picking belt.

A second simple device, shown in Fig. 6, is a twin-wheeled trolley designed to place planks over the pit top. Prior to using this device five men were needed. The same job can now be carried out by one man.

A further very effective idea is an aerial ropeway bucket spotter (Fig. 7). The device consists of a standard 1¼-in. pitch roller chain similar in many ways to the modern type of mine-car creeper. The top of the bucket carriage engages with the chain and thus is automatically moved away from the loading station.

Design and Maintenance

Referring back to the analysis of surface manshifts it can be seen that 27.5 per cent. are expended on maintenance, which indicates the possibility of savings in this section. An immediate saving can be made by the substitution of grease- or oil-filled conveyor rollers for the conventional type, necessitating frequent applications of the grease gun. Not only are they lower in first cost but also last for a longer period. For all new plant being installed in No. 8 Area this type of roller is being specified. An example is the supporting rollers under Peake turntables which it is specified must be so designed that they can be grease-packed for a 12-month run and lubricated when the rotary table is lifted for its annual inspection. Where lubrication is necessary some automatic lubrication systems which ensure an adequate supply of clean grease with minimum of manpower are employed.

Design is of paramount importance in this respect, and it cannot be over-emphasized that the drawing office staff should take pride in the production of specifications and designs enabling maintenance to be reduced to the minimum. "Cleaning up" should be almost a thing of the past, and its

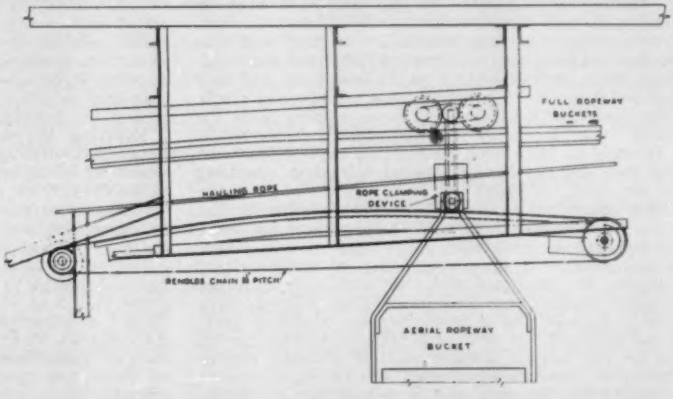


FIG. 7.—AERIAL ROPEWAY BUCKET SPOTTING DEVICE.

necessity indicates faulty design which should be modified at the earliest opportunity. It would be of considerable assistance if senior designers were allowed to visit modern plants and examine the general arrangements and drawings, thus familiarizing themselves with best modern practice.

Conclusions

We are all living in an age of technical change, but not withstanding the great strides made in technical developments, the standard of living depends to an ever increasing extent on the inclination of employees to work willingly and in harmony together, and to accept and co-operate with the introduction of further mechanization and electrification.

The author wishes to thank Mr. D. Harrison, Area general manager, for permission to present this paper and Mr. H. P. A. Johnson, Area production manager, for help and guidance. Views expressed are the author's, and not necessarily those of the National Coal Board.

DISCUSSION

MR. R. A. MACDONALD, in seconding the vote of thanks, asked the author if he had any rules for limiting the cost of labour-saving plant. The AUTHOR replied that it could be proved that the capital value of equipment which would save manpower would vary between £1,000 and £4,000. Any replacement equipment should be of the best modern design, utilizing to the full the most suitable modern materials and method. Often this would replace obsolete equipment of which much revenue would be incurred if the replacement had not been effected.

In reply to MR. B. BARRACLOUGH, who asked if the ratio between men saved by negative and those saved by positive action could be identified, the AUTHOR said that very few men had been saved by positive action as it was preferred, wherever possible, to clamp down on recruitment which would automatically reduce the labour force. However, in the very near future there would be considerable savings by positive action.

MR. E. BRAMMER asked the author's opinion of the best means of saving manpower on dirt disposal systems. Replying, the AUTHOR said the economics of dirt disposal were a function of the amount to be hauled and the length of the haul, and each job must be treated individually. Further points to keep in mind were the requirements of the Clean Air Act. It was found in their particular set of conditions that the best method was by conveyor belt from the heapstead into a suitable bunker on the spoil heap, and final disposal from there by some type of dumping truck. This gave the advantages of layer tipping with the added consolidation by repeated passage of the truck.

In reply to MR. P. G. TREGELLES, the AUTHOR said that they did not have a central workshop operating at the time, although one was scheduled to commence operations in June, 1959. He considered that a central workshop, properly designed and efficiently managed, could contribute much to an overall saving in manpower. If the maintenance of equipment at collieries was attempted with their own staff up to the standard required by modern machine mining, there would inevitably be a great increase of fitting staffs at the collieries. If these cyclic overhauls were carried out at the central workshops, the ultimate overall manpower requirement would be reduced.

MR. H. M. SPANTON said it seemed that an undue proportion of fitters were working on shifts when machines were at work, and it appeared probable that there were insufficient on the shifts when the machinery was idle. He asked if the author could suggest a reasonable basis upon which fitter's time should be distributed between day, afternoon and night shifts. He also enquired how much more it would cost to build a washery which would also handle dirt as well as coal. Could the author confirm the satisfactory operation of gravity-controlled mine cars at Ledston Luck Colliery?

The AUTHOR agreed that often an undue proportion of fitters were on the day shift when machines were idle, and in consequence, could not undertake maintenance work on jobs *in situ*. Where central workshops backing was available, a high proportion of the fitters' work at the collieries would be on *in situ* jobs, thus it would follow that probably 50 per cent. of the available fitting staff could be most economically used on back shifts. The increased capital cost to build a dense-medium washery to handle the whole make of dirt and coal was of a comparatively small order. Due to modern machine mining, most washeries were now designed, in any case, to deal with run-of-mine coal, which could at times consist of up to 90 per cent. dirt. With suitable gradients, a full mine car would push an empty car off a cage in the pit bottom without any mechanical aids.

MR. H. HARTLEY asked if it was likely that manpower, saved by work being transferred from collieries to central workshops, would be absorbed in fully implementing the board's scheme of planned maintenance. The AUTHOR agreed that there was much to be done before planned maintenance reached the high standard specified by the board's senior engineers, but in his opinion the central workshops would be a great asset in these matters.

MR. H. P. A. JOHNSON, the branch president, said that they were fortunate in having smaller workshops in the Area which would contribute in the region of 150 men. The author and the production staff had organized the new workshops and they intended to put the various departments of the shops into operation in gradual stages. In August, 1959, they would have a further 150 surface workmen available who would be surplus to requirements at their collieries which were undergoing reconstruction. As a result, the manning of the new workshops should be relatively easy.

MR. E. HEDLEY asked, with regard to negative and positive action, whether the author agreed that there was a distinction without a difference. It had been stated that positive action was taken when replacing steam winders by electric winders. Was there not a case for retaining at least a proportion of steam winding to burn some of the material which they were not able to sell, but which was produced when preparing the remainder of their products for market?

Replying, the AUTHOR said there was a difference between positive and negative action. The redundancy which would be created by a large reconstruction must be dealt with by positive action, whereas the savings resulting from minor schemes could be obtained best by negative action, as Mr. Hedley suggested, by restricting the intake of labour.

In the AUTHOR'S opinion it was not in the best national interest to continue the use of steam winders in order that coal which otherwise would be unsaleable, should be consumed. Anything that they could burn at the collieries could be more efficiently burned by power stations using boilers designed for the combustion of these low grade fuels at a fairly high overall efficiency.

International Steel Research and Development

SCOPE AND LIMITATIONS

Research and development in the steel industry as seen from an international standpoint with special reference to the European Coal and Steel Community, were discussed by A. H. Ingen Housz in the course of the Sixth Harold Wright Lecture, 1959, at a recent meeting of the Cleveland Scientific and Technical Institution, Middlesbrough. An important part of the lecture was devoted to a discussion of the problems that limit the universal development of international research, and it is from this that the following extracts have been taken.

SINCE World War II, said Mr. Ingen Housz, international organizations had been formed in Europe with the special purpose of promoting international co-operation. In this connection the Organization of European Economic Co-operation had established a Steel Committee to promote the development of the steel industry. According to the treaty the High Authority had four courses open to it: (1) It could indicate general aims of development; (2) it could advise for or against actions with respect to the use of raw materials or the prevention of shortages; (3) it could give favourable or unfavourable advice on investment projects, although the High Authority could prohibit an investment; (4) it could promote technical and economic research, amongst others by giving financial support. The quintessence of the author's contribution was, why and how did the High Authority perform this task.

Difficulties of Approach

One might proceed on the assumption that the ground was prepared for common research; but the development of steel techniques had encountered many fundamental problems. New possibilities seemed to be arising, but due to the character and unit size of the steel industry their study was extremely expensive. The High Authority therefore threw itself with conviction into the study of problems which were in the air but which did not seem to progress sufficiently.

To give shape to these problems the High Authority created a Technical Committee for its guidance. This committee, it was recalled, consisted of representatives from the six member-countries, appointed from among their research institutes. Also a representative from the United Kingdom, at present Mr. Ridgion of BISRA, attended the meetings. This committee made proposals to the High Authority, which submitted these for advice to the Advisory Committee and the Board of Ministers first; only then could the High Authority take a decision. Moreover, the election of experts enabled the insitutes to partake in the carrying out of the study. It was early established that the High Authority would not set up an institute of its own but that it would co-operate with the existing bodies.

Soon the question arose as to who could take the initiative for such investigations: the High Authority on more or less theoretical grounds, or the industry itself in view of its own real need and in connection with its own national institutes? In some quarters a certain fear existed that the services of the High Authority might be affected one-sidedly by some specific interests, which, in that way, would be given disproportionate attention, whereas the funds resulting from general levies should be used for problems of general interest only.

That gave rise to the demand for general lines to be followed by the High Authority in granting support for research. The author regretted that such lines had not yet been established. He admitted that some criteria had been accepted, but an exact elaboration had not yet taken place. When taking a decision the High Authority considered: (1) If the research really promoted general aims; (2) if it was of direct or indirect interest to a sufficiently large number of enterprises; (3) if private initiative could be encouraged relative to investigations which could not be carried out by private means alone because of prohibitive costs.

Furthermore it appeared desirable that applications for support should not be considered directly by an organization of the High Authority as for instance the Comité de la Recherche Technique (Technical Committee) but that they should first pass through a national sieve (for instance IRSID, in France or CNRM, in Belgium). That rule by itself was accepted platonically, but infringement of the rule in one concrete case of application for the improvement of a certain rolling mill in one of the ECSC countries gave rise to serious difficulties. Later it became clear that this application would never have passed the national technical institute of the country concerned.

General Availability of Results

With such detailed problems, complicated questions arose immediately and although they were still being studied they should be mentioned because their general and special interests could collide. The question of the ownership of acquired knowledge was a particular instance. It was a general principle of the treaty that results obtained from investigations supported by the High Authority must be made available to all those interested within the Community. It was not in-

tended that results should be patented, but that they should be generally published and thus be at the disposal of all members of the Community, and of the steel industries in other countries, *e.g.*, the United Kingdom. That was an example of the modern tendency towards broader exchange of knowledge in the international steel industry.

Complications arose when, during such research, inventions resulted for which protection by such special rights as patents would be desired. That was particularly the case when the High Authority carried out investigations in co-operation with an enterprise which also participated in financing the research. In such cases a special arrangement had to be made beforehand between the High Authority and the enterprise concerned, so that an acceptable equilibrium was created between the interests of the Community and those of the enterprise with regard to patenting, to granting licences to third parties within and without the Community, and also with regard to the conditions to be made in this connection. The fact that patent legislation in the six countries was not at all the same made things complicated; in that connection many legal questions had still to be settled.

It was obvious, stated the author, that the development of these complicated situations and questions needed time. As long as there was little clarity in these relations there would remain some hesitation, and some hampering with respect to starting new projects. So long as these problems were unsolved, the High Authority would probably be unable really to enter the field of detailed problems; its activities would have to be confined to questions of general and fundamental character. Instancing some of these the author mentioned the use of the low-shaft furnace, the use of oxygen in steelworks, the character and function of flames in furnaces, the direct reduction of ores, and the principles of rolling.

Tractor Shovel of 19½ tons Capacity

BUILT around a special seven-roller rigid track frame version of the Doncaster-built BTD-20, the 19½-ton International Drott B-20K-3, crawler tractor shovel now being made by the International Harvester Company of Great Britain, Limited, has a 124-b.h.p. Rolls-Royce quick-starting diesel engine, and matches the biggest of the four International Drott skid-shovels made in the United States.

All standard Drott features are retained in the new shovel, in addition to the extra performance obtained from the BTD-20's full reverse six-speed transmission. Each reverse speed is claimed to be 20 per cent. faster than the same speed forward and the equipment can reverse at up to 8.4 m.p.h.

The new skid shovel will be available with the versatile 4-in-1 bucket as well as the regular 3 cub. yd. shovel. This is an exclusive, patented design that, at a touch of the control lever, changes from normal-shovel operation into bulldozer, clamshell or carry-type scraper, as required.

FORTHCOMING EVENTS

JANUARY 11

Institution of Production Engineers (East and West Ridings Region): Meeting at the hotel Metropole, Leeds, at 7 p.m.: "Production Engineering Problems in Connection with the Manufacture of Tubes," by D. B. Such.

JANUARY 13

Society of Chemical Industry (Corrosion Group): Meeting at 14, Belgrave Square London, S.W.1, at 6 p.m.: "Corrosion Problems of High Temperature Pressurized Water Reactors," by J. N. Wanklyn.

North Wales Metallurgical Society: Meeting in the lecture theatre, Flintshire Technical College, Connah's Quay, nr. Chester, at 7 p.m.: "Analytical Control by means of the Quantometer and Quantovac," by W. S. Sykes.

JANUARY 14

South Wales Institute of Engineers: Meeting at the Institute Buildings, Park Place, Cardiff, at 6 p.m.: "Construction of Shallow Tunnels and Deep Culverts," by G. A. Jones.

Combustion Engineering Association (Southern Region): Meeting in London: "Factors Affecting the Choice of New Boiler Plant." Alternative works visit to Hobart House and Lloyds Building.

JANUARY 15

West of Scotland Iron and Steel Institute: Joint meeting with the Iron and Steel Institute, Engineers' Group, at 39, Elmbank Crescent, Glasgow, at 6.45 p.m.: "Engineering Aspects of a Modern Open-hearth Steel Plant," by J. A. Kilby and J. C. Gordon.

JANUARY 19

Institution of Mechanical Engineers: Meeting at the King's Head Hotel, Newport, at 6 p.m.: "Special and Alloy Castings in Mechanical Engineering," by A. B. Everest.

JANUARY 20

Society of Instrument Technology (Newcastle Section): Meeting in the conference room, Roadway House, Newcastle-upon-Tyne, at 7 p.m.: "Open-hearth Furnaces," by J. Allen.

Mining Institute of Scotland: Meeting at the Mining Laboratories, Edinburgh: "Mining Difficulties in Scotland and their Method of Treatment," by R. B. Dunn.

Institution of Production Engineers (Midlands Region): Meeting at the Wolverhampton and Staffordshire College of Technology, at 7 p.m. "Powder Metallurgy—its Application to the Production of Engineering Components, and its Advantages and Limitations," by P. R. Marshall.

JANUARY 22

Sheffield University Mining Society: Meeting in the Engineering Lecture Theatre, St. George's Square, Sheffield, at 7.30 p.m.: "Developments in the Yorkshire Coalfield," by R. G. Baker.

JANUARY 28

Coke Oven Managers' Association (Northern Section): Meeting at the Three Tuns Hotel, Durham, at 7 p.m.: "Modern Blast-furnace Operation and Possible Future Trends," by D. Vernon.

National Association of Colliery Managers

JANUARY 12

Yorkshire Branch: Meeting in the Miners' Welfare Hall, Brodsworth, at 3 p.m.: "Methane Drainage," by I. H. Morris.

JANUARY 15

Yorkshire Branch: Dinner/dance at the Danum Hotel, Doncaster.

JANUARY 18

Midland Branch: Meeting at the Denman's Head, Sutton-in-Ashfield, at 6.30 p.m. Paper by S. Vardy.

JANUARY 19

South Wales Branch: Meeting at the Castle Hotel, Neath, at 6 p.m.: "Mine Planning and the Colliery Manager," by J. D. Morton.

JANUARY 27

Lancashire Branch: Meeting at the offices of the North-Western Divisional Board, Portland Street, Manchester, at 6 p.m.: "Tunnelling during the Last Ten Years in the N.W. Division," by W. M. Linkletter.

CANADA'S production of lead in 1958 was 185,770 short tons, or 4,286 tons more than in 1957. Output from mines in British Columbia, which regularly produce about 80 per cent. of the Canadian total, increased by 4,600 tons: there were also small increases in Newfoundland, Quebec, and Ontario. Production in Yukon Territory declined by 1,700 tons, and in New Brunswick by 1,040 tons.

Failures and Successes in Coal-face Mechanization

RESULTS IN A HIGHLY MECHANIZED AREA

In the Worksop Area of the Yorkshire coalfield, a large, highly-mechanized area, a wide variety of power-loading machines have been tried out. The reasons for failures and successes at different collieries in the Area with Meco-Moore cutter-loaders. trepanners, slicers, shearers and Gloster Getters, from 1950 until the present time, are briefly described by J. C. Stewart and E. B. Park, in a paper presented to the Midland Institute of Mining Engineers at Doncaster on November 5. The appended extracts are from the paper, which will be published in the "Transactions" of the Institution of Mining Engineers.

AT the beginning of 1957 Worksop Area had 19 mechanized projects, the output from which amounted to 30 per cent. of the total output from the Area, the mechanized saleable o.m.s. being 5.8 tons. At 10 of the Area's 12 collieries power loading had been introduced, and at certain collieries it was fairly well established.

During 1957 an extensive programme to increase the percentage of power loading over the next two years was planned, with special emphasis on collieries where power loading was already well established. In this programme it was decided to concentrate on three machines that had been proved in the Area, *i.e.*, the Meco-Moore cutter-loader, the trepanner and the slicer, and in particular to extend the use of trepanners in seams of between 3 ft. 3 in. and 4 ft. in thickness, or where working conditions would be improved by leaving a coal roof.

The result of this programme was that by the end of June, 1959, the percentage of the total Area output produced by power loading had increased to over 45 per cent., this output being obtained from 31 mechanized projects.

The degree of face mechanization in January, 1957, and June, 1959, at each of the collieries in the Area where there is any power loading is shown in Table 1.

This considerable increase in power loading, as was to be expected, was not obtained without failures. In some cases the methods used proved to be successful, in others results gave sufficient encouragement for the experiments to be continued, even though they were not up to the standards required, while a few projects had to be written off as failures and the machines withdrawn. As will be seen from the list of machines in use, quoted in Table 1, the main expansion in mechanization has been with AB trepanners.

AB Trepanners at Shireoaks Colliery

At Shireoaks Colliery, where the initial trials showed considerable promise of success, the use of AB trepanners has been extended and at the present time practically all the output from the colliery is being produced by these machines. The overall face o.m.s. has now risen to 173 cwt., in comparison with 98 cwt. when Meco-Moore cutter-loaders were in use. To achieve these results, the face length of new panels has been increased to 230 yd. in order to obtain a better ratio of power-loaded length to stable-hole length on the units.

As trepanners were installed on the longer faces a considerable increase in productivity resulted, in spite of a number of faults, and on double-shift production regular weekly outputs of over 4,500 tons were obtained from a unit at an average o.m.s. of 13½ tons. At this time the men were paid at a task rate with a completion bonus; but later on a system of contract payment was agreed upon, and this resulted in still better productivity being obtained. The highest o.m.s. obtained over a full quarter was 15.27 tons with a machine working on a single-shift production.

Trepanner at Dinnington Colliery

The trepanner installation at Dinnington Colliery is worthy of mention because the unit is working successfully, although working conditions are rather difficult. The face being worked is in the Barnsley

TABLE 1.—*Comparison of Percentages of Mechanized Output in January, 1957, and June, 1959.*

Colliery.	Number of projects in June, 1959.	Types of machines.	Percentage mechanized output in January, 1957.	Percentage mechanized output in June, 1959.
Orgreave	3	Meco-Moore cutter-loaders	7.1	46.0
Treeton	1	AB trepanner	Nil	13.0
Maltby	5	Meco-Moore cutter-loaders and Huwood slicers	37.2	68.1
Dinnington	1	AB trepanner	31.4	14.7
Thurcroft	3	,, ,,	Nil	42.2
Firbeck	2	Meco-Moore cutter-loaders	11.8	20.7
Kiveton Park	5	Meco-Moore cutter-loaders and AB trepanners	27.8	83.5
Manton	3	,, ,,	48.7	60.3
Brookhouse	4	,, ,,	59.4	62.1
Shireoaks	4	,, ,,	93.4	100.0

bed and it is 200 yd. long. The normal seam section in this area is 4 ft. 3 in., but on the face in question there is a very bad " swilley " which gives the seam a vertical displacement of 31 ft. over a distance of 145 yd., and in this swilley area the section of coal increases to a maximum of 7 ft. in the bottom of the swilley. The face is rising in the line of advance at 1 in 8, and the maximum gradient along the face in the swilley is 1 in 5.8.

There is a weak bind roof above the seam and the trepanner was arranged to cut its own roof at a height of 3 ft. 9 in., leaving 6 in. of coal to support this weak bind. This 6 in. of coal increased to 3 ft. 3 in. in the centre of the swilley, decreasing gradually towards each end of the face. Roof conditions throughout the swilley area were excellent, as would be expected with the thick top coal, but at the points where the seam changed to its normal section fairly bad roof conditions were experienced. These bad conditions have been improved to some extent by systematic forepoling and by the addition of packs at these points.

The main problem with the operation of the machine on this face was connected with holding down the trepanner haulage chain in the swilley area. This was overcome by setting hydraulic props, fitted with a special holding-down device on the bottom of the prop, at intervals of about 10 yd. throughout the swilley area. These props were withdrawn as the machine reached them and reset again immediately behind it.

Owing to the rather difficult conditions on this unit the machine is worked on single-shift production and, in spite of the difficulties, an average of two strips per shift has been regularly obtained, with 2½ strips obtained on many occasions. Results from this unit for the five-week period ended July 4, 1959, were 406 ton/day at an o.m.s. of 8.08 tons.

Compressed-air Slicers at Maltby Colliery

First, results obtained with the Huwood slicer at Dinnington Colliery were sufficiently good for its use to be extended in the thicker seams; but as these seams are mainly confined to compressed-air power on the face, it was necessary to develop a compressed-air-driven slicer. The manufacturers were consulted and, in co-operation with the Area staff, a prototype machine was made and put to use at Maltby Colliery.

The method of working the Barnsley seam at this colliery was by double-unit panels, which are not really ideal for power-loading of this type. However, this layout had to be accepted for the initial trials of the slicer and the machine was installed on one side of a 300-yd. double unit, the other side of the unit being worked by hand until a second slicer became available.

The first trials indicated that the slicer would not work successfully unless the seam was precut, and a compressed-air coal-cutter with high-speed haulage gear and continuous rope haulage was provided. Numerous cutting heights were tried, but it was found that cutting near the middle of the seam in the hard band gave the most assistance to the operation of the slicer in both directions of its travel.

The first machine settled down to work fairly satisfactorily after the correct horizon for precutting had been found, and later a second machine was put to work on the other side of the double unit. However, as the output from this unit at that time was limited, due to a major reorganization scheme at the colliery, both sides of the unit could not be worked at the same time, but had to be worked on alternate shifts.

This first slicer installation, although disappointing at times and not giving the results anticipated, did give sufficient encouragement for the Area officials to go ahead with the planning of future slicer projects at this colliery. It was quite evident, however, that these new installations must be on single-unit faces in order to render them more compact and easily manageable, and to dispense with the trouble caused by slow progress on one side of a unit holding up the whole unit.

The First Installation

The first of these single-unit slicer installations was started up in October, 1958, and after a short period, when the first weight came on to the face and the unit had to be filled-off by hand for a fortnight, the installation has produced steadily improving results.

The face is 190 yd. long with a seam extraction of 6 ft. 9 in., leaving a coal roof which is supported on hydraulic props and link bars. The waste is fully caved with a breaking-off line of hydraulic props set between the bars in the back row of the supports. The face is precut to a depth of 3 ft. 4 in. at the beginning of each shift. This is sufficient for four slices, which are taken off during the remainder of the shift, and is done regularly on two shifts per day.

This face is now one of the main production units of the colliery, and for the second quarter of 1959 an average production figure of 779 ton/day at an o.m.s of 13.38 tons was achieved, the results for the best week in the quarter being 888 ton/day at an o.m.s. of 15.11. These results are far in advance of anything previously obtained at the colliery, and it is now intended to replace other systems of power loading by these single-unit slicer faces as the old units finish. Of the total output from the colliery 68 per cent. is at present produced by power loading, and this will rise in about two years to almost 90 per cent.—all from single-unit slicer faces.

To cope with this position an extensive programme was laid down for the training of personnel in working and maintaining the machines, and although there have been heavy losses through mechanical breakdowns the position is now improving considerably, as the officials and men at the pit are becoming more experienced in the use and operation of machines.

The authors express their thanks to Mr. E. W. Lane, Area general manager, Worksop Area, North-Eastern Division, National Coal Board, for allowing this paper to be published, particularly as it records the failures and gives reasons for them. The views expressed in the paper are those of the authors and not necessarily those of the National Coal Board.

Metallurgical Patents in the US

Some Recent Inventions

THE following descriptions for metallurgical patents have been taken from details given in the "Official Gazette" of the United States Patent Office.

Rolling Mill with Segmental Rolls

A rolling mill comprising in combination a supporting base, a carriage having a pocket open at its upper end, the carriage being movably supported on the base, mechanism connected to the carriage for imparting to it linear reciprocatory movements. A toothed rack is supported on the base extending parallel to the direction of carriage movement with its teeth facing upwardly, a self-contained unit comprising a frame seated in the pocket and removable through the upper open end thereof. Bearings mounted in the frame support a pair of rolls. Intermeshing pinions are secured to the rolls and a rack-engaging pinion secured to one roll engages the rack for imparting rotational movements to the rolls in response to reciprocation of the carriage. —2,903,925.

Method and Apparatus for Controlling the Contour of Rolls in a Rolling Mill

A control system for automatically controlling the deflection of the working rolls in a rolling mill comprises a rolling mill stand, two working rolls carried by roll chocks which are free to move relative to the mill stand, and at least two back-up rolls, hydraulic jacks being positioned to apply force to separate the chocks of the working rolls and connected through a valve to a source of hydraulic fluid under pressure in excess of the maximum pressure required for separation of the chocks of the working rolls. A strain gauge registers increases and decreases in the strain on the rolling mill stand during the rolling operation produced by increases and decreases in the pressure under which its rolls are operating. An electrical circuit connected with the strain gauge, includes a motor and control with means operated by the motor for controlling the operation of the valve to adjust the pressure on the hydraulic fluid in the jacks in direct proportion with increases and decreases in the strain on the mill stand as measured by the strain gauge. Provision is made for adjusting the level of response of the electrical circuit.—2,903,926.

Cold Rolling Mills

A six-high straight-type cold rolling mill comprises upper and lower intermediate driving back-up rolls, a pair of work rolls disposed between the back-up rolls and driven by frictional engagement with the latter. A single relatively narrow upper backing roll bears downward on the upper back-up roll at the centre of the latter, constituting its sole backing support localized over a narrow portion at the centre. Two lower backing rolls are disposed below the lower back-up roll, constituting its sole backing support, the lower backing rolls being spaced a distance substantially equal to the width of the narrow backing roll, with the space between aligned vertically with the narrow backing roll thereby to give a wavy stress to the back-up and working rolls. Side supporting assemblies are disposed at the inlet and outlet sides, respectively, of each of the work rolls horizontally supporting the latter along the entire length of the work rolls. Each of the side supporting assemblies includes a shaft, a series of spaced-apart rollers having diameters slightly smaller than that of the related work roll and rotatably mounted on the shaft, each shaft being spaced substantially horizontally from the associated work roll. Rigid support means for the shaft engage the latter in each of the spaces between the series of rollers, thereby preventing deflection of the shaft and, hence, of the related work roll.—2,907,235.

Apparatus for Producing a Metal Workpiece by Cold Extrusion

An apparatus for forming a metal disc from a metal strip and cold extruding a workpiece from the disc, comprises, in combination, a frame, a support member and a guideway in the frame, a multi-part recessed mould comprising two co-operating members, and a plunger slidably positioned within the guideway. One mould member is attached to the plunger, the other mould members being attached to the support member. Means connected to one of the plunger and support members actuate one of the plunger and support members, each having attached thereto one mould member, and for moving one of the mould members towards the other of the mould members to close the mould and to form the metal disc. Hydraulic springing causes the actuating and moving means to apply pressure against the so-formed metal disc within the mould causing the cold flow of the metal of the metal disc and accumulating energy during application of pressure against the disc and for rapidly relatively displacing one of the plunger and support members towards the other in releasing the accumulated energy after the beginning of the cold extrusion of the metal within the mould to cause the flow of the metal in assuming the shape of the mould. Means connecting the hydraulic springing to one of the plunger and support members for subjecting the springing to a progressively increasing pressure after the actuation and movement of one mould member towards the other mould member while the hydraulic springing is causing the actuating and moving provisions to apply pressure against the so-formed metal disc within the closed mould. Provision is made for adjusting the capacity of the hydraulic springing in accordance with the workpiece to be made, whereby the metal disc is formed from the metal strip, the cold flow of the metal of the metal disc being caused within the closed mould. The metal is therefore cold extruded in a single operation due to offsetting the sharp drop in pressure applied on the metal within the closed mould brought about by the extrusion of the metal while under pressure within the mould and the maintaining of the flow pressure on the metal within the mould.—2,903,924.

IN collaboration with the German company of Otto Hubbe, Keith Blackman, Limited, is now manufacturing under licence the Fischer automatic dust filter.

New Economy Mine Tub Cleaner

MANUFACTURED by Sinex Engineering Company, Limited, and marketed exclusively by Holman Brothers, Limited, Camborne (Cornwall), the new Sinex mine tub cleaner, shown in Fig. 1, comprises essentially a robust support frame in which is pivoted a tippler cage. The tippler cage, which accommodates mine tubs of up to 1-ton capacity, is suspended by two hanging trunnions from a beam structure which carries a Sinex 3,000-r.p.m. rotary electric high-amplitude vibrator.

The pit tubs are inverted after being placed in the tippler cage, and are vibrated for approximately 50 sec. during which time all deposits completely disintegrate and fall away.

The rolled-steel channel "A" frames which support the vibrator unit and tippler cage are fitted with rubber shock and vibration absorbers and bolt holes are provided for permanent installation and for grouting into concrete. The vibrator is suspended below a beam with anti-vibration mountings. The beam is constructed in heavy sheet steel to which is attached two hanging trunnions, one at each side of the beam.

To the lower end of each trunnion is fitted a bearing journal which has a large surface area. The bearings are the pivot points for the tippler cage which is fabricated in steel plate and angle iron to form a rigid enclosure for the mine tub. The tippler cage can be easily inverted by hand when a tub is inside.

Operating with currents at 1½ amp. per phase at 400/440 V, the vibrator exerts a centrifugal force varying between 4,000 and 7,500 lb. depending on the power requirement.

FIG. 1.—SINEX MINE TUB VIBRATOR.

Underground Waters of the Kent Coalfield

VOL. 119, Part 3 (December, 1959) of the "Transactions" of the Institution of Mining Engineers contains a paper on the underground waters of the Kent coalfield contributed by J. H. PLUMPTRE to the Southern Counties Institute of Mining Engineers.

Mr. Plumptre is general manager of the South-Eastern Division of the National Coal Board. He recalls the data obtained from the initial sinkings and boreholes carried out in the early part of this century as recorded in a paper by E. O. FORSTER BROWN, read before the Institution of Civil Engineers in 1922, and brings that information up to date from the experience gained over the past 35 years.

A description is given of the geological formation of the area and the author suggests that the coalfield is unique in Great Britain in the presence of large quantities of water at considerable depth. The possible sources of the water are considered, from which the author discounts an earlier theory that it must come from the carboniferous limestone underlying the Coal Measures, and suggests that the weight of evidence seems to establish the water-bearing secondary rocks as the source of the water encountered in the upper parts of the Coal Measures.

Some of the mining difficulties resulting from the presence of water are described, including ventilation and pumping. The problem of disposal of the large quantities of water raised to the surface is referred to.

The topicality of the Channel Tunnel project is mentioned, and it is recalled that the coalfield owes its actual discovery to an earlier endeavour in this field. It is suggested that the experience related in the paper may be relevant to many of the problems involved in driving a tunnel under the English Channel.

Other papers in this part of the IME "Transactions" are: "The Use of Hydraulics for Mechanical Apparatus near the Coal Face" (A. E. Crook), and "Red Beds in the coal measures of the West Midlands" (R. H. Hoare).

Increased Rumanian Output Estimated for 1960

HAVING over-fulfilled its planned output for the year 1959 of iron, steel and rolled products, the Rumanian People's Republic has increased its estimates considerably for 1960, the Draft Economic Plan for which was announced on December 6 by the First Secretary of the Rumanian Workers' Party, Gheorghe Gheorgiu-Dej.

In order to achieve an increase of the national income by 12.5 per cent., large-scale investment, amounting to 59 per cent. of the total investment, is to be made in industry, about four-fifths of this being used for the expansion of the power, fuel, metallurgical, machine-building, chemical, fibre and rubber-processing industries. As the result of this, and of more efficient utilization of existing plant, industrial output is expected to increase by at least 14 per cent. Iron ore mining output will, however, go up by 27 per cent. to 1,400,000 *tonnes*. Steel output will go up by 22 per cent., to 1,700,000 *tonnes*, and that of rolled products by 51 per cent., to 1,140,000 *tonnes*. An increase of productivity by 11 per cent. is anticipated.

ELECTRIC FLASH-BED REDUCING FURNACE

Experience in West Germany

The aims in the development of electric smelting methods for iron ores are low current consumption, high throughput per plant unit, and the possibility of using low-grade raw materials, in particular, ore fines and coal slack. With these objectives in view, the Iron Smelting Research Institute of the Aachen Technical College has developed a new method of electrical reduction of iron ores, based on the use of a "flash bed." This work is reported by W. Wengel in "Stahl u. Eisen," August 20, 1959.

THE use of granular materials of small particle size in a state of flow is already common in allied fields of metallurgical practice[1, 2]. This particular branch of the treatment of pulverulent materials is known in German technical terminology as the "flash bed" ("Fliessbett") or "turbulent bed" technique[3].

A "flash bed" is obtained when a stream of gas is blown through a bed of finely powdered materials with such a velocity that the separate particles are brought into violent motion relative to each other; but the gas velocity is insufficiently high to carry the particles away in the gas stream. The solid particles in such a flash bed have the same degree of mobility as the molecules in a liquid. The similarity of behaviour is further underlined by the fact that, depending on the gas velocity, the surface of the flash bed is more or less turbulently disturbed in the same manner as the surface of a boiling liquid.

The flash-bed technique is already being extensively used in the flash-roasting (blast roasting) of iron ores, on a large industrial scale.[4] In regard to the reduction of iron ores, certain difficulties affecting the stability of such flash beds have hitherto prevented the wider use of this technique, except in some special cases[5].

The prerequisite for the successful operation of a reducing flash bed is that it shall remain constant and stable, throughout the course of the reactions taking place therein. If, for instance, as a result of such a reaction, sundry particles in the flash bed tend to amalgamate into larger particles, the maximum grain size appropriate for the particular gas velocity will be exceeded and the flash bed becomes an ordinary, static furnace bed. In the majority of cases, such an agglomeration to larger particles retards the gas flow to such an extent that its activity in the conduct of the required reaction is completely inhibited.

This occurs, for instance, when finely powdered ores are exposed to the action of reducing gases in a flash bed. At economically reasonable reduction temperatures—the lower limit is about 700 deg. C.—nearly all ores tend to stick together after a moderate degree of deoxydation, say 20 to 30 per cent., and form sintered lumps of appreciable size[6, 7]. In the electric flash-bed reduction of iron ores, consequently, care is needed to ensure and maintain the stability of the bed.

Origin of Flash-bed Process

The original conception of the electric flash-bed process stems from the observation that the caking or sintering of a bed of finely granular iron ore could be prevented by intermingling particles of other substances in the ore bed which did not tend to agglomerate with the fine ore particles. Such conditions are, for example, obtained when the bed is formed of a high proportion of finely ground coke, and only a small proportion of iron ore fines. In such a flash bed, the individual grain of ore is, in the statistical mean, always surrounded by coke (carbon) particles.

If the ore particles are held sufficiently long in such a coke flash bed, however, the reciprocal encounter of some ore particles with other ore particles can no longer be prevented. Even such a heterogeneous bed of finely powdered fuel and fine grained ore will, eventually, succumb to the gradual transformation of the fine ore particles into a coarsely granular ore, or even coarser reduction products, which will gradually sink to the bottom and accumulate on the furnace hearth. It will depend on the fuel excess, the depth of the bed, and the reaction temperatures, whether the reaction products accumulating on the furnace hearth have the required degree of reduction (deoxidation). These conditions remain essentially the same whether the process is conducted within the range of sintering temperatures or whether higher temperatures are applied, at which the reduction products are fluidized, and collect on the hearth.

A further essential feature of the electric flash-bed furnace is the use of the coal (carbon) bed, substantially filling the reaction space, in the capacity of an electrical resistance, for which purpose current-conducting electrodes are buried in the fuel bed. To conduct an electric current through a furnace burden containing besides a coke or coal bed, also a layer of fluid iron and a layer of fluid slag, there are three possibilities available: Firstly, to make the electrodes dip in the fluid slag layer (Fig. 1*a*). In view of the relatively low, electrical resistance of fluid slags, in this case, nearly all the electric current will pass through the fluid slag;

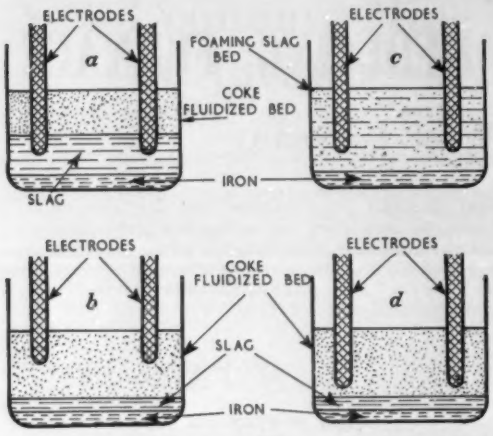


FIG. 1.—GENERATION OF ELECTRIC HEAT IN A FLUIDIZED-COKE BED FURNACE.

this will then form the electrical resistance layer within which heat is generated.

The industrial application of this method of heating encounters two considerable impediments. Firstly, the electrical resistance of such a slag blanket is so low that with the dimensions practically possible for such a reduction furnace, the voltages which can be applied to the electrodes dipping in the slag are too low. The voltage drop through such a slag blanket is, depending on the furnace size, of the order of only 20 volts. A second disadvantage is that, owing to chemical reaction between the carbon of the electrodes and the constituents of the slag, the electrodes dipping in the slag are very rapidly consumed, unless, indeed, very complicated and heat-consuming cooling arrangements are applied to the electrodes. This method of converting electrical energy into heat for the conduct of metallurgical reactions is used in the Lubatti process[6].

The second possible way of converting electrical energy into thermal energy in a system comprising a fluid-iron bath/slag blanket/turbulent (flash) fuel bed requires that the carbon electrodes be inserted in the turbulent fuel bed (Fig. 1*b*). If the electrode spacing can be made sufficiently great, arcing as generally understood should not occur: on the contrary, the electric current will pass through the fuel flash bed, there being parallel conduction through the fuel particles and through the gas-filled space between the floating fuel particles. At the high temperatures present in this case, current conduction through the gas-filled space across the short distances separating the adjacent fuel particles is no longer an arc discharge in the true sense; the high degree of ionization of the gases probably has a decisive influence on the passage of the current.

In view of the high degree of turbulence in a fuel-flash bed, there is a continuous and rapid equalization of temperatures between the regions on the connecting line between the electrode tips in which the conductivity is particularly high and the regions of the flash bed occupying the remaining available volume. When a current is passed through a flash bed of fuel, it may be assumed that the local temperature peaks will be relatively low, compared with the temperature of the fuel bed as a whole. Consequently, an electrically heated flash bed should be found most suitable for conducting metallurgical reactions. The third possibility, within the scope of the present consideration, consists in that the separating plane between the slag blanket and the turbulent fuel bed is eliminated; in particular, by causing intimate mixing of the slag and the fuel, within an appropriate temperature range, so as to obtain a foaming flash bed of slag and fuel (Fig. 1*c*).

Foaming Slag Blanket

Working with a foaming slag blanket is a process already familiar in metallurgy, especially in steelmaking. While in those cases the foaming of the slag is accepted as an inevitable, undesirable accompaniment, in the present case it is a deliberately sought phenomenon, forming the basis for a valuable, new technique of reduction; since, if the ore to be treated is fed into the slag and reducing fuel is also brought into the slag, then when the slag has reached a suitable degree of viscosity, the evolution of carbon-monoxide within it will cause the formation of a foaming-slag flash bed. If electrodes are immersed in a foaming flash bed of this type, and suitably spaced, the current is conducted through the foaming slag and generates heat in the slag, as in the Lubatti process.

Compared with the Lubatti process, however, this foaming-slag flash bed offers considerable advantages. On account of its low density, the electrical resistance of the foaming slag has a value many times greater than that of an ordinary liquid slag bed. The voltage drop between the electrodes is therefore considerably higher and according to the measured values is of the same order of magnitude as the voltage drop in a purely liquid bed. Furthermore, the electrode loss in electrodes inserted in the foaming slag is far less than in electrodes inserted in coherent liquid slag. In fact, the surface of the electrodes is mainly in contact with the gaseous component of the slag and not with the liquid phase.

Designing an electric flash-bed furnace for industrial purposes, there are now intermediate solutions for converting electrical into thermal energy, as, for instance, is shown in Fig. 1*d*. In this case, the electrodes supplying the current are inserted so deeply into the coal bed that their tips are near the surface of the slag. With an arrangement of this type, a part of the electric current passes directly through the coal bed, accompanied by heat generation, whereas another part passes from the electrode tips to the slag and flows through the slag layer.

It depends on the adjustable distance separating the electrode tips from the slag surface as to what part of the current passes directly between the elec-

trodes and what part flows through the slag. In order to obtain a slag as hot as possible, this last possibility has proved to be very advantageous, particularly in small electric flash-bed furnaces.

200-kW Flash-bed Furnace

The essential phenomena occurring when an electric current passes through a coal bed have been investigated at Aachen, in the first place in the laboratory, with flash beds with a power take-up of from 20 to 40 kW. The favourable results have led to the construction of a larger, semi-industrial experimental furnace, the power capacity of which, in tests made up to the present, is about 170 kW. This furnace is shown in Fig. 2 in the form which has been arrived at after various modifications. It consists of a shaft with a refractory casing. In the bottom of the shaft, there is a tap hole.

The electrodes in the experimental furnace, are of graphite and are 65 mm. in dia. They are inclined at an angle of about 5 deg. from the perpendicular. They are lowered into the furnace shaft to a depth of about 30 cm. above the furnace bottom and penetrate to a depth of about 20 cm. into the coal bed which, in the working state, has a depth of about 50 cm. above the furnace bottom. Three electrodes are used, arranged in triangular formation and the furnace is accordingly supplied with three-phase current.

The raw-material charging equipment consists of two pulverized-coal bunkers filled by a self-dumping skip, which are emptied into the furnace by a worm feed with a variable speed, adjustable drive. An additional smaller bunker is also provided with a rotary sluice valve for the intermittent feeding of additives. The waste gas is carried away from the centre of the furnace through a dust trap and a water bed. The dimensions of the furnace are 600 mm. (24 in.) internal diameter and 1,800 mm. (71 in.) in height to base of stack.

Satisfactory working is ensured if the following precautions are observed. The depth of the coal bed is determined at a value known to be suitable, *e.g.*, 50 cm. by the volume of coal to be charged in unit time. If the depth of the flash bed decreases, then more coal is supplied and conversely. It is necessary, therefore, to have one coal bunker available with an infinitely variable feed, discharging independently of the ore feed. The bunker above the furnace discharging to the sides of the furnace is used for this purpose.

The temperature in the flash bed, and thus its metallurgical functioning, is regulated by the volume of ore charged. If the tapping temperature rises above the desired value, then more ore is charged in unit time, and conversely. For this purpose, the ore can be mixed with approximately the stoichiometric volume of reducing coal, it being advisable to maintain a slight excess of coal and to feed the difference continuously from the coal regulating bunker. It is also possible, however, to feed ore and coal separately to the furnace from different bunkers. In the experimental furnace, the bunker discharging into the middle of the furnace is used to feed the ore.

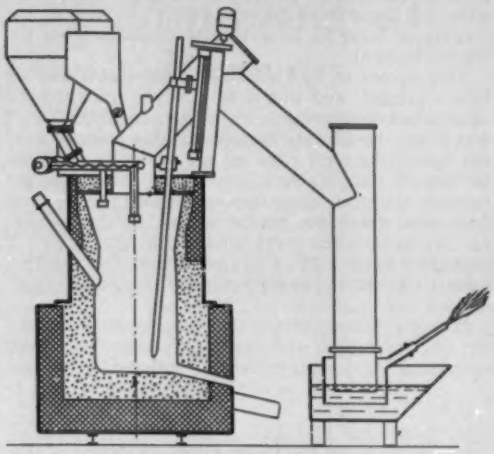


FIG. 2.—200-kW ELECTRIC FLASH-BED FURNACE OF THE IRON SMELTING RESEARCH INSTITUTE AT AACHEN.

Finally, for a given furnace voltage, the current strength, and thus its output, is regulated by the depth of the inserted electrodes. The experimental furnace has setting motors above the electrodes for this purpose which, actuated severally or simultaneously, enable the furnace to be operated at a constant output.

The principal information obtained over an experimental period of one year in regard to the functioning of an electric flash-bed reducing furnace is given by the author.

Experimental Results of Furnace Trial

Electrical Engineering Aspect. — Oscillograph measurements have shown that at least in the furnace voltage range of about 180 volts, the fluidized coal bed is heated entirely by resistance, at an electrode spacing of about 30 cm. Small arcs were only occasionally apparent, and should disappear completely, on increasing the electrode spacing. The power consumption has been measured and found to be comparatively low; in any case, probably not greater than in an electrical reducing furnace with a static bed.

It was found possible to run the experimental furnace at up to 380 volts applied current, this being the highest voltage available in the Aachen installation. The electrical constants have as yet not been sufficiently verified to judge of the practicability of high-tension working, in regard to arcing, and power consumption.

On the assumption that, even with high voltages, we are still dealing with a problem of pure resistance heating, it is possible to work on the basis of a simple dependent relationship between the depth of electrode insertion in the fluidized bed and the distance between the electrodes in accordance with Ohm's law. With the same electrode spacing, therefore, the depth of insertion into the fluidized bed

must be reduced on passing to a higher voltage, *i.e.*, with the same fluidized bed depth, the tips of the electrodes must be at a greater distance from the hearth bottom.

This agrees in fact with the results obtained up to the present: and this is why, when operating the experimental furnace at higher voltages, *e.g.*, 380 volts, the furnace hearth remains cold because the tips of the electrodes are set relatively far from the hearth, which is poorly insulated. With a larger furnace, with normally insulated walls, the distance from the electrodes to the hearth bottom which, for instance, when working the furnace at 380 V should be around 40 to 50 cm., can be considerably greater without the lower part of the furnace becoming too cold.

Power Consumption.—The experimental furnace has unusually high radiation and convection losses, compared with an ordinary industrial furnace which, with a total power consumption of 150 to 160 kW, calculated from the temperatures at the surface, amount to between 45 and 50 kW. Bearing in mind these high heat losses through the furnace walls which, moreover, even in a small, experimental furnace, can be considerably reduced by suitable insulation, the electric power consumption in an experimental furnace during the making of pig-iron which alone has hitherto been investigated from the aspect of the heat balance, is at the same level as in ordinary low-stack furnaces. For instance, in making pig from hæmatite ore, a power consumption of about 2,500 kWhr./ton pig-iron was determined from the analysis of the heat balance.

The particular advantage of the electric flash-bed furnace in regard to lower power consumption should be found in the possibility offered of extensive preliminary reduction of the pulverulent ore by the furnace gases. It has already been proved by tests that with preliminary reduction of the ore with oxygen elimination outside the flash bed, the power consumption could be reduced from an average of about 30 to about 20 per cent.

Performance.—The ordinary electric low-stack furnace has a throughput capacity referred to the hearth area of about 100 kg. pig-iron/sq. m./hr. One of the most important possibilities offered by the fluidized-bed furnace is that of increasing this relatively low specific output. The first tests made on the basis of the heat balance have already shown an output in terms of unit hearth area of about 160 kg. pig-iron/sq. m./hr. The only restricting factor was the amount of electric power available which could be supplied to the furnace. With preliminarily reduced ore, the specific hearth output could already be increased to about 190 kg. pig-iron/sq. m./hr. The hourly capacity of the experimental furnace per cubic metre furnace volume is already greater than is customary in blast furnaces.

Flash-bed Furnace Products.—The experimental furnace has not been used up to the present to make any specific particular end products since the basic test programme undertaken served in the main to elucidate technological principles. The quality of the pig-iron obtained in the various tests was more or less incidental. Systematic tests, with variation of the slag composition, the depth of the fluidized bed, the temperature of the fluidized bed, the grain size, the charge, etc., are to follow. The iron hitherto produced had a carbon content between 0.5 and 4 per cent. and a silicon content between 0.1 and 13 per cent.

The molten slags where the iron had a higher silicon content, were almost free from iron. With a Si content below 1 per cent. in the pig-iron, higher iron contents were found in the slag, depending on the working conditions. The question as to the possibility of reducing the iron content of the molten slags to the concentrations found in ordinary refining slags can so far be answered with regard to the experimental furnace, in that under the conditions obtaining in the Aachen furnace, it is possible to attain lower iron contents in the slag. A pre-requisite for this is that the hearth temperature shall be kept sufficiently high. For example, at a tapping temperature of 1,450 to 1,500 deg. C., such slags had iron contents of 2.4 per cent. If, on the other hand, the tapping temperatures in the experimental furnace dropped below about 1,450 deg. C., the iron contents in the slag increased and could considerably exceed 10 per cent. In this connection, it should be noted that iron extraction has hitherto been performed only with highly acid slags, *i.e.*, without additives.

Material Requirements.—Up to the present, the fluidized bed furnace has appeared to be relatively insensitive to the grain size of the ore. In the experimental furnace, grain sizes of about 0.5 mm. have been found most suitable. It was also possible, however, to use considerably larger grain sizes. Here, also, the size of the furnace is an important factor, together with the available depth of fluidized bed.

When pulverized coal is charged as fuel, a grain size up to 0.5 mm. has also proved most suitable. When using bituminous coals, in particular, lignites, larger grain sizes also appear practicable, since in the severe drying, calcining and cracking conditions, these are broken down in the furnace into small particles. Almost all types of ore have been charged up to the present without difficulty, *i.e.*, both hæmatite and magnetite ores, brown ironstone, etc. The experimental furnace has not worked successfully hitherto with a large slag volume from ore gangue and fuel ash. In such cases, it tends to boil. At present it has not yet been ascertained, however, to what extent these conditions can be changed by altering the slag composition; suitable mixing; varying the grain size of the ore; the depth of the fluidized bed; and, finally, preliminary reduction of the ore.

Up to the present, high-temperature coke, bituminous anthracite with about 22 per cent. volatiles, and Bavarian lignite have been fed as fuel to the experimental furnace. It is particularly important to note that the fluidized-bed furnace could be worked with bituminous coals without forming condensable tar constituents in the exhaust gases.

The electric flash-bed reducing furnace has fully proved its potentialities on a semi-pilot scale, in a

200-kW furnace. Compared with previous furnaces of the same type, it can process pulverulent or fine-grain raw materials at up to 380 V and a high specific performance, that of blast furnaces being attained and exceeded. The power consumption figures for pig-iron production are at the same level as for furnaces in present use. The new furnace is particularly suitable for the preliminary reduction of ore through the furnace gases and offers the possibility of considerably reducing current consumption.

REFERENCES

[1] C. C. Hall and L. J. Jolley, *Petrol*, **13**. (1950), 217-23.
[2] H. Pickler, *Brennst. Chem.*, **30** (1949), 105-09.
[3] W. Kraus, "Fliessbett-Technik" (Fluidized-bed Technique). *In. Fortschr. Verfahrenstechn.* 1954-55, Vol. 2, pub. H. Niessner and V. Grigall, Weinheim (Bergstr.), 1956, 44-53.
[4] A. Johannsen and W. Danz, *Chem.-Ing.-Techn.*, **29** (1957), 563-72.
[5] J. Willems, *Stahl u. Eisen*, **79** (1959), 74-80 (Hochofenausschuss paper No. 317).
[6] O. Stelling and J. Periowetoff-Morath, *Jernkont. Ann.*, **141** (1957), 237-60.
[7] E. P. Barett, C. E. Wood, V. Miller, W. E. Brown, R. P. Porath and C. Brasky, *Rep. Invest. Bur.*, Min. No. 4092 (1947), 15 pp.
[8] A. Pecorari, *Radex Rundsch.*, 1945 (475).

Swedish Iron Mine to Yield 1,000,000 tons Annually

EQUIPPED with what is claimed to be the most modern mining machinery in Europe, the old Central-Swedish iron-ore mine of Stråssa was reopened on October 29, after having been in disuse since 1923. The reopening forms part of the scheme of the Grängesberg Company to revive the Bergslaget mining district with part of the funds they received after the Government's taking over most of the Grängesberg share in the Lapland ore fields.

The Grängesberg scheme includes not only reopening of old mines. It is a tight-fitting arrangement of mining, enriching and processing at new and modern plants, including an iron-works with an initial capacity of 300,000 tons of finished plate per annum now nearing completion at Oxelösund, on the Baltic coast south of Stockholm.

Output from Stråssa is estimated at 1,100,000 tons per annum, making this mine the fourth in Sweden. After enrichment, the ore will hold an iron content of 68 per cent. The ore supplies are at present calculated to last for at least 100 years.

New ore-concentration and enrichment methods, largely evolved by the Grängesberg company's own engineers, form the background of Stråssa's revival. The ore contains 80 per cent. magnetite and 20 per cent. red iron ore, which makes it necessary to use different concentration methods.

The mining processes, too, present some new and interesting aspects. A novel type of Atlas-Copco drilling machine with exceptionally long Coromant-tipped steels will be used for driving diverging benches from below the outcrops, so that after the rounds the ore slides down along the slanting walls for loading. The drills can make holes of up to 115 ft. The record, so far, is stated to be 820 ft. by one man in a single shift.

THE SANDVIK STEELWORKS COMPANY, Sandviken, Sweden, has started to manufacture carbide burrs. For many years the company has supplied carbide blanks for burrs to other manufacturers, and it is now to make the finished product.

Ironmaking at Barrow

LITTLE more than a century ago Barrow-in-Furness was a tiny village whose inhabitants were mostly engaged in agriculture. It was the Industrial Revolution which established Barrow as an ironmaking centre and made its name famous throughout the world. Iron—charcoal iron—had been made in the district for years, but it was the building of blast furnaces by Henry William Schneider and Robert Hannay which started Barrow off as one of the leading industrial centres of the north-west. Now the town has notched up 100 years of ironmaking, an event which the Barrow Ironworks, Limited, has recently celebrated.

Schneider and Hannay started construction of their works in January, 1859. The Barrow Ironworks, Limited, and the Barrow Hæmatite Steel Company, Limited, are lineal descendants of these two pioneers. The first two furnaces were ready for operation in 10 months and were charged and blown-in on October 17. The formal opening of the works took place the next day. A third furnace came into operation soon afterwards; a fourth followed in 1860. Three more furnaces went into operation in 1862, and four years after that a steelworks had been established and the Barrow Haematite Steel Company, Limited, took over the ore mines and ironworks of Schneider, Hannay & Company.

Rail rolling laid the foundations of the steel fortunes of Barrow. By 1872, Barrow Ironworks was among the largest in the world. Twelve blast furnaces were operating, and rails from the steel mills made glistening ribbons over the maps of Canada and the United States. Two wars and nationalization have effected changes in production and in administration, but the name Barrow is still a power in both ironmaking and steel production, the one through the Barrow Ironworks, Limited, and the other through the Barrow Hæmatite Steel Company, Limited.

Publications Received

WE acknowledge with thanks the following house organs and other publications received.

LANCASHIRE DYNAMO HOLDINGS, LIMITED, London, S.W.1—"Electricity in Industry," No. 17. BRITISH CHAMBER OF COMMERCE, Mexico, "Intercambio," No. 191. BRITISH TRANSPORT COMMISSION, London, N.W.1—"Transport Age," Vol. 2, No. 11. HENRY WIGGIN & COMPANY, LIMITED, Birmingham—"Wiggin Nickel Alloys," No. 54. STEEL, PEECH & TOZER (BRANCH OF THE UNITED STEEL COMPANIES, LIMITED), Rotherham (Yorks)—"Phoenix Gazette," December.

ZINC DEVELOPMENT ASSOCIATION, London, W.1—"ZDA Abstracts," Vol. 17, No. 12. EDGAR ALLEN & COMPANY, LIMITED, Sheffield—"Edgar Allen News," December.

Underground Locomotive Signalling System

INSTALLED recently at Barony Colliery, in the Scottish Division of the National Coal Board, is an underground signalling system to give automatic control to four locomotives operating along a single underground track with by-passes. Designed by MR. JAMES STORRAR, chief electrical engineer of the East Ayr Area, the system gives automatically the equivalent service of a manned signal box located at pit bottom.

In providing a suitable system at Barony, it was found that independent control of the separate points would restrict the speed of operation of the locomotives without providing the necessary safety. The system actually adopted is the lock-and-block system similar to that used on British Railways. This involved the energizing of relays far in excess of the number which could be operated from an intrinsically safe source, and all equipment used had to meet flameproof requirements before the system could be installed.

Independent control boxes are provided at each set of points where signals are necessary. These control boxes are interlocked electrically. Each control box is an independent unit regarding power supply, but all are on the same primary supply so that a power failure will cut off all signals and not just one section. All signals and points indicators are fitted with two bulbs to guard against bulb failure.

Constant Supervision

This system gives constant supervision of each of the four locomotives in operation on the single track. On leaving the locomotive station, for which a signal is required, the locomotive enters the control system and never leaves it until it returns to the locomotive station. If locomotives are moving normally the system merely records the movements, but should they attempt to approach each other, either from in front or behind, the system immediately reacts and stops one or other of the locomotives, allowing the other to proceed under caution if it is safe to do so.

When a train is to proceed from the pit bottom to the far end of the system, on striking an advance detector a "message" is passed in to the far end through each control box in turn. This alerts the whole system to the fact that a train is to pass through. Should the system be clear for the train to proceed, the last control box repeats the "message" back through all control boxes to the one from which it originated. This "message" then releases the proceed signal, and the train moves forward. At the same time another "message" is passed backwards to the next control box and all operative signals behind the train are locked out.

As soon as the train has passed the proceed signal, the signal returns to normal and another "message" is sent inbye through each control box to the effect that the train is on the way. Except at by-passes, no other train will be accepted by the control boxes. As the train passes each control box in turn it will receive clearance ahead and at the same time a "message" is sent backwards to clear all but the last section behind. It is, therefore, possible to have two trains proceeding inbye but there will always be one clear section between them.

The system is intricate, as every possible situation has had to be taken into account, and all failures are to safety. A manual has been drawn up, indexing each item of equipment and detailing all circuits, which greatly facilitates the location of faults. After exhaustive tests lasting for three months it has not been possible to produce any condition, normal or abnormal, in which the system could signal two trains into collision.

BS on Caking and Swelling Properties of Coal

NOW available from the British Standards Institution is Part 12 ("Caking and swelling properties of coal") of the revised edition of BS 1016, "The Analysis and Testing of Coal and Coke." Parts 1-8 and Part 11 have already been issued. The new British Standard deals with the determination of the crucible swelling number and of the Gray-King coke type of coal. The method for the determination of the crucible swelling number is essentially unchanged, except that electrical heating is now a permitted alternative to gas heating.

The determination of the Gray-King coke type has not previously been introduced in a British Standard, although the coke type has been used for some time as a parameter for coal classification. In its original form the test was known as "the Gray-King Carbonization Assay at 600 deg. C." when yields of coke, gas, tar and ammonia were determined in addition to the coke type.

For coals of high crucible swelling number, the Gray-King coke type was originally determined after dilution of the sample with electrode carbon; it has recently been shown that the latter may be replaced by certain anthracites without affecting the results obtained.

Copies of this Standard may be obtained from the BSI, 2, Park Street, London, W.1, price 6s. (postage extra to non-subscribers).

North of England Institute Awards

THE North of England Institute of Mining and Mechanical Engineers reports that the George May prize of 30 guineas for the session 1958-59 has been divided between two student members, Mr. Peter Hutchinson, for his paper "Haulage and Face Working in Two American Coal Mines," and Mr. J. M. Sables for "Winding and Haulage Reorganization at Eden Colliery."

An institute prize of 5 guineas has been awarded to Mr. F. F. Roxborough for his paper on "The Application of Scraper Box Equipment to Thin Seam Mining."

The Austin Hopkinson medal was awarded to Mr. A. K. Ghose, student.

All the papers submitted to the senior section were by joint authors and it was decided that no award of the G. C. Greenwell medal should be made on this occasion.

Mining Oversea

in which we review, from time to time, interesting mining matters reported by our contemporaries abroad

NEW MATERIAL FOR DRILLING BITS

TIPS from sintered fused alumina are claimed to have given promising results for rotary drilling purposes, as long as impacts or shock loads are not incurred. Difficulties caused by thermal stresses

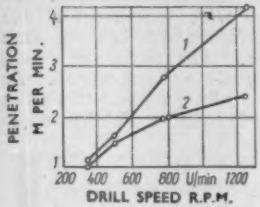


FIG. 1. — SPEED OF PENETRATION OF DRILLING BITS TIPPED WITH SINTERED FUSED ALUMINA IN MEDIUM HARD (1), AND HARD (2), COALS.

during the brazing process have not been entirely overcome, and mechanical methods of fastening the tips to the bit bodies are now being investigated.

The best results in drilling coal of medium and greater hardness were obtained at high rotational speeds of up to 1,250 r.p.m.

Fig. 1 shows the speed of penetration in metres per minute at varying spindle speeds from 318 to 1,250 r.p.m. for medium hard coal (1), and for hard coal (2). The life of the fused alumina tips was higher than that of tungsten carbide tipped bits. The main attraction of the new material lies, however, in the cheaper costs for the material, amounting for Russian conditions to only 22.2 per cent. compared with tungsten-carbide bits.—"Bergbautechnik," August, 1959.

MAGNETIC WIRE ROPE TESTS

FROM 1953 onwards, the Association des Industriels in Belgium has, in co-operation with INICHAR, studied the problem of electro-magnetic rope testing and has developed test equipment which is stated to give reliable results.

Whenever concessions regarding rope life or rope safety factor are granted, the Belgian authorities insist on routine tests of the ropes by this method. The results prove not only that dangerous conditions can be detected immediately, but also that ropes which have passed the test satisfactorily can safely be worked for further periods of time.

The first test is normally carried out when the rope has worked for 60 per cent. of its expected life, and in any case before the eighteenth month of its usage. The test is repeated in intervals which rarely exceed three months. Any progressive deterioration in its condition can, therefore, be judged and the proper time to replace it can be forecast. It is, of course, admitted that much work still remains to be done before the interaction of the many various factors is fully understood.—J. STREBELLE, "Annales des Mines de Belgique," July-August, 1959.

WORLD SHAFT SINKING RECORD

THE world shaft sinking record which was achieved in sinking the Saaiplass shaft in the Free State has been broken. It has recently been announced that the new 18-ft. dia. Novo-Butovka shaft in the Donetz coalfield was sunk and concreted 867 ft. during the month of April, 1959. The total personnel in 24 hr. consisted of 56 to 58 men. The average time required for one cycle was 5 hr. 50 min. New types of hand-held sinker drills were used for drilling the 32 holes to a depth of 7 ft. 7 in.

Main reasons for the speedy advance are: the simultaneous sinking and lining method, using a folding type of shuttering as shown in Fig. 2; the use of a cactus grab of 0.85-cub. yd. capacity; and the reduction of all ancillary operations to a mini-

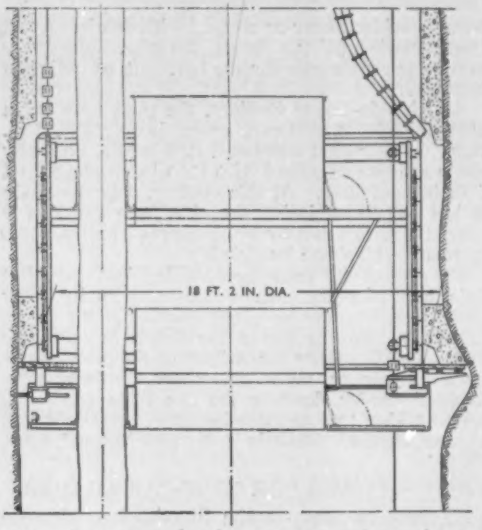


FIG. 2.—FOLDING TYPE OF SHUTTERING USED TO ACHIEVE WORLD SHAFT SINKING RECORD.

mum. The weight of the sinking stage, including the shuttering stage, the sinking deck with the grab and the tensioning deck is approximately 130 tons. —I. C. NOVSKIJ and N. A. MOROSOVA, "Ugol," August, 1959.

SINKING STAPLE SHAFTS

FOLLOWING the successful introduction into the Ruhr district of a staple-shaft sinking method with a large pilot hole, two Belgian coal mines have also adopted this system. At Zwartberg Colliery,

one of the two kibbles used for raising men and material is specially equipped so that it can be used by the men for clearing the pilot hole in case it has

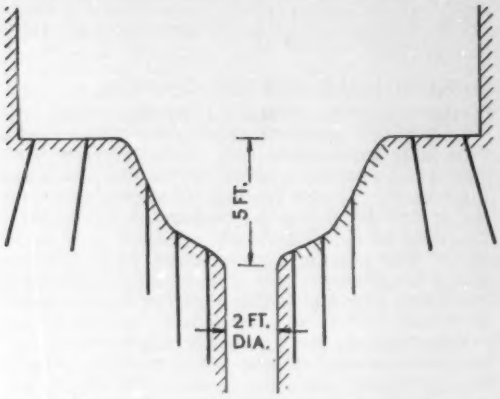


FIG. 3.—DRILLING PATTERN IN SHAFTS USING A PILOT HOLE.

become bridged over or clogged with debris. Apart from drawing off the debris, the pilot hole serves as a large centre hole for the burn cut, as indicated in Fig. 3.

At Rieu-du-Coeur Colliery, the pilot hole has a diameter of 2 ft. and each round is only 2 ft. 2 in. deep. Larger pilot holes of 2 ft. 8 in. dia. normally allow a depth of round of 6 ft. 6 in. in shale, and 5 ft. in sandstone. At this colliery, a heavy chain is left suspended inside the pilot hole and this is moved up and down by two compressed-air winches to remove blockage by debris.

To protect the men from falling into the pilot hole, a brazier-like cage is inserted with its lower 20-in. dia. portion into the hole while the upper 28-in. dia. portion allows the debris to enter the hole. Loading from the bottom of the pilot hole is by a scraper or, as at Zwartberg Colliery, by a duckbill loader, loading the muckpile from one round taking two to three hours.—P. STASSEN and H. VAN DUYSE, "Bulletin Technique-Mines," April, 1959.

LAMP FITTINGS FOR MINE-CAR LOADERS

IN order to improve the illumination of stone drifts where the overhead type of rocker-shovel or mine car-loader is used, 15-W luminescent lamps have been designed in the USSR which are fixed to the four corners of the body of the loader. Light flux measurements have shown that this results in a much better general illumination than when headlights were used, and this is believed to be the cause for a rise in productivity of about 50 per cent. L. A. SALTSEVITCH, "Ugol," September, 1959.

IRREGULAR FORMS OF SHOTHOLES

WHEN single chisel bits are used for drilling shotholes, it is sometimes observed that the holes are not truly circular but more triangular and this may cause difficulties when inserting the cartridges. With cross bits, the form is similar to a pentagon. Polish research workers have explained this by the fact that the drill bit and steel do not revolve around the centre of the hole but around points which themselves move around in a circular path.

In the case of single chisel bits, the recommended remedy is a smaller radius for the cutting edge of the chisel across its end, and in the case of cross bits, either X-bits or double-chisel bits will ensure a truly circular section for the shothole.—T. OPOLSKI, "Przeglad Gorniczy," June, 1959.

ROOF CONTROL IN PROP-FREE-FRONT COAL-FACES

ILLUSTRATED in Fig. 4 is the roof support for a coal-plough face with prop-free-front support system, in a Ruhr colliery near Gelsenkirchen. The average supporting forces were measured for each of the props along the face which initially were all of the friction type. The temporary waste chocks, set at 15-ft. intervals, are not shown. As the solid line indicates, very little support was given to the roof strata in the immediate vicinity of the

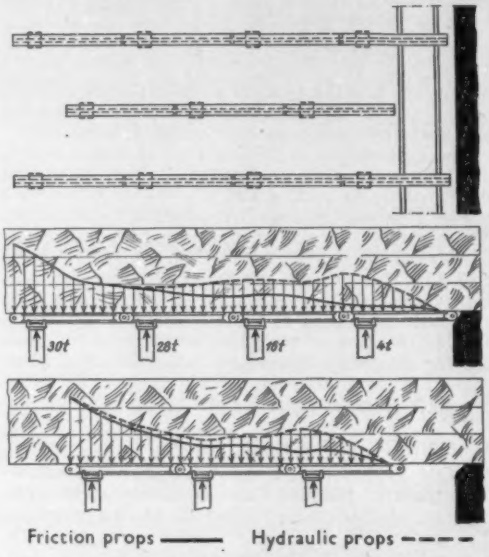


FIG. 4.—INCREASED ROOF SUPPORT ON A COAL-PLOUGH FACE.

face; with an average initial convergence of about 2¼ in., flaking and formation of steps was frequently observed and the clod used to break off along the face line. These poor roof conditions were improved considerably after the introduction of 30-ton hydraulic props. Fig. 4 shows in dotted lines the increased support to the roof near the coal face. Measurements confirmed that both the initial and the total convergence were appreciably less.—W. SCHAEFER, "Glückauf," September 12, 1959.

High-strength Stainless Steels

DEVELOPED FOR USE AT ELEVATED TEMPERATURES

FOR some years, the research and development department of the United Steel Companies, Limited, has been working in collaboration with Samuel Fox & Company, Limited, a United Steel subsidiary, in the development of a range of high-strength stainless steels for elevated temperature service.

This work, which has led to the introduction of the Jethete series of steels, was initiated because of the limitations of existing steels in providing adequate mechanical strength at elevated temperatures combined with good corrosion resistance. It is possible, for example, to obtain a wide variety of mechanical properties from low-alloy steels, but they are insufficiently resistant to corrosion.

Austenitic stainless steels of the 8 per cent. nickel, 18 per cent. chromium type have a good corrosion resistance but suffer from the major disadvantage of low mechanical strength. Similar considerations apply to fully ferritic steels, where ductility is also poor. By cold working, it is possible to improve the mechanical strength of both austenitic and fully ferritic stainless steels, but the higher properties cannot be retained at elevated temperatures.

Transformable Steels

High strength can be allied to corrosion resistance, however, by means of the transformable group of stainless steels. The most widely used steel in this group is the low-carbon 12 per cent. chromium steel. This has a reasonable combination of mechanical properties, but is deficient in strength after tempering at 650 deg. C. (which might be required after welding) and has relatively poor impact properties. Despite these limitations, this steel was selected as the starting point in the Jethete series.

One of the difficulties with the 12 per cent. chromium steel is that it is near the border line of structural stability. Chromium is a strong ferrite-forming element, and if appreciable amounts of ferrite are formed in the structure, the hardening effect is lost. By increasing the carbon content, ferrite formation can be prevented, but only at the expense of making the steel unsuitable for welding and reducing its impact resistance. To obtain improved strength, therefore, it is necessary to increase the tempering resistance by the addition of such elements as molybdenum and vanadium.

As these elements are also strongly ferrite-forming, it is again necessary to balance the structure. For this reason, the Jethete series of steels are low-carbon 12 per cent. chromium-nickel steels, containing additions of molybdenum, vanadium, niobium and other elements as may be required to produce the desired properties.

Jethete M.151 is a low carbon 12 per cent. Cr-No-Mo-V composition, in which the composition is controlled so that the structure is fully austenitic at solution and welding temperatures. On the other hand, the tempering resistance is not so great as to prevent softening prior to fabrication. The major use of Jethete M.151 is in sheet form, where it must be capable of softening for fabrication by pressing, but the full mechanical properties can be recovered by a relatively simple heat treatment, which does not involve too high a solution temperature.

Jethete M.152 is a development from Jethete M.151, having a similar composition but with high impact properties and a low transition temperature. The improved impact level is advantageous when producing large sections.

While Jethete M.152 represents an appreciably increased strength level compared with the straight 12 per cent. chromium steels, there are applications where an intermediate strength will give satisfactory performance. Jethete M.153 was introduced for this purpose. It is a 12 per cent., Cr-Ni-Mo composition, with higher impact properties and a slightly lower cost than Jethete M.152.

The high temperature properties of the 12 per cent. chromium steels are quite reasonable in the 400-500 deg. C. temperature range. A need arose for improving these properties, however, particularly for use in aircraft turbines, and Jethete M.160 was developed to meet this demand. This is a 12 per cent. Cr-Ni-Mo-V-Nb composition, and the niobium addition provides the improved high temperature strength.

With further increases in aircraft engine temperatures, the strength of Jethete M.160 becomes inadequate, and accordingly Jethete M.210 was developed. This is a 12 per cent., Cr-Ni-Mo-Co-B composition, and the latest in the Jethete series, although development work continues towards the production of other high strength stainless steels with still further improved properties.

Much of this work has been undertaken initially in response to problems encountered in the field of jet aircraft and guided missiles. Increasing interest is now being shown by other industries with analogous problems, and these steels are being employed in growing quantities for such applications as the low-pressure turbine blades in power stations.

Iron and Steel Institute Bibliographies

The information department of the Iron and Steel Institute has just published two biblicgraphies. The first, "Continuous Casting of Steel," is a continuation of an earlier one of the same title, published about two years ago, and contains abstracts of papers published since then. The second, "Oxygen in Steelmaking," is an entirely new production, specially prepared to meet the growing demand for information about the newer processes of steelmaking.

DISTRIBUTION OF COKE IN THE US

A REPORT issued by the US Bureau of Mines for the year 1958 deals with the distribution of oven and beehive coke and coke breeze. Statistics cover the quantities of oven and beehive coke consumed in each state, by principal uses; the origin and destination of coke deliveries, according to use; and consumption trends in nine geographic regions are shown in statistical tables. Also shown are the quantities of breeze consumed in each state, as well as the source of breeze deliveries.

Coke consumption in the United States, it is pointed out, decreased by nearly 22,000,000 tons in 1958, about one-third less coke being distributed than in 1957. This decrease was due largely to greatly reduced deliveries to blast-furnace plants, although smaller quantities of coke were used by all major consumers. Blast furnaces were the largest coke consumers, using 90 per cent. of all deliveries. Iron foundries and other industrial plants each consumed 4 per cent. of the total distributed, followed by producer- and water-gas plants, who used 1 per cent.

Of all coke distributed, 1 per cent. was used for residential heating, and less than 1 per cent. was exported. Decreased deliveries to blast furnaces, foundries, and other industrial plants followed closely the general decline in industrial activity that occurred in the first half of 1958. There were no significant changes in the geographical distribution pattern in 1958 and relative consumption in each region was comparable to 1957. The Middle Atlantic, Illinois-Indiana, and Ohio regions remained the largest consumers and together used nearly three-quarters of all coke distributed.

Cheaper Ammonium Sulphate Production

SULPHATE of ammonia is today gradually losing ground to other more economically produced nitrogenous fertilizers because of its high raw material costs. But sulphuric acid is rendered cheaper by a new process developed in the United States to rid power station and sulphuric acid plant stacks of their sulphur nuisance and marketed in this country by Chemical Construction (G.B.), Limited, 9, Henrietta Place, London, W.1. It is designed to recover sulphur salts for use in the production of ammonium sulphate. In the "Chemico" process of acid fume removal, ammonia gas is introduced into the flue gases between the economizer and the air heater. The ammonia reacts in the gaseous phase with the sulphur oxides produced by combustion of the sulphur contained in the fuel. The product is a cloud of ammonium sulphur salts such as sulphite, bisulphate, sulphate, and other similar combinations. These solid salts are quantitatively removed as a powder from the gas stream in high-voltage electrostatic precipitators.

The residue extracted by the process is a mixture of ammonium sulphur salts and fly ash, and when separated from the fly ash the salts form the basis for the production of ammonium sulphate fertilizer. The great advantage of using this residue for fertilizer production is that sulphuric acid, one of the more costly items used in making ammonium sulphate, is available in the residue. At present many millions of tons of sulphuric acid in the form of SO_2 and SO_3 are discharged to the atmosphere in a completely wasteful and obnoxious form because an efficient and economical method of elimination and recovery has not been available.

Earthmoving Equipment for Ironstone Mine

DELIVERED recently to John Lysaght's Scunthorpe Works, Limited, by the Northern International Construction Equipment dealers, R. Cripps & Company, Limited, was a fleet of new International crawler tractors. The machines included Doncaster-built BTD-20 tractors powered by 124-b.h.p. Rolls-Royce diesel engines, as well as the now universal BTD-6.

The big crawlers were accompanied by matching 10-14 scrapers and cable control units; the smaller BTD-6 being fitted with hydraulic Bullgrader equipment.

Overburden stripping at Lysaght's Flixborough mine, is a year-round task to enable continuous production of the high grade self-fluxing ore which is fed direct to the adjacent Normanby Park Steelworks. For this work the 10-14 scrapers have been fitted with sideboard extensions giving an increased heaped capacity of 15.32 cub. yd. It had been the intention originally to use an International TD 18A to push the scrapers but the BHD-20's have proved more than adequate for self-loading.

Fig. 1 shows one of the scrapers filled overflowing, digging time being about 65 sec. The sand-clay disintegrates into a free flowing material which, although tending to spill from a fully laden scraper, is completely free from voids. Excavation on these lines, therefore, is claimed to be productive and economic.

FIG. 1.—AN INTERNATIONAL SCRAPER IN ACTION.

Tubular Lining for Tunnels

A NEW tunnel lining known as the Swallow tunnel lining composed of a series of left- and right-hand helices has recently been introduced by Crompton & Harrison, Limited, of Seaham (Co. Durham). Helices are composed of members shaped to conform to the circumference of which they form a part. Each member is in length, twice the length of the sides of the squares formed by the intersection of the helices.

The members may be composed of steel tubes, other sections, or concrete. The steel tube construction is shown in Fig. 1, and a drawing of a steel tube segment is shown in Fig. 2.

FIG. 1.—PROTOTYPE LENGTH OF TUNNEL LINING OF TUBULAR SECTION.

With a tubular construction, each member comprises two short lengths of tube, butt welded on to a steel sphere. The angle between the two tubes conforms to the curvature of the helices of which it is a part, the tubes being located as chords to the helices. At each side of the sphere, stub pieces are attached in line with the transverse axis.

The ends of the adjacent members butt on to the stub pieces over which they are an easy fit. Normally they are held by the pressure of the strata on the lining, although provision is made for locking pins to be used when erecting the members.

The first series of members is held in position by a circular or arched ring, to which they are attached at about their centres. Each member is inclined at an angle of 45 deg. to the longitudinal axis of the tunnel. The second set of members is inclined at 90 deg. to the first, one end of each second member embracing a stub piece in the centre of an adjacent member in the first ring. The stub piece in the centre of the member of the second ring is inserted in similar manner into the end of the next member in the first ring. Pins are inserted at the joints to hold the new members in position until complete rings have been assembled, when they may be removed. Thereafter additional rings of members may be attached in any sequence.

When additional members are inserted at the open fringe end of the network they may be held temporarily in position by means of pins passed through holes in the ends of the arms and matching holes in the stubs. Tie rods, or chains hooked into the joints of the immediately preceding ring and laced diagonally round the stubs of the newly inserted member, may also be used under certain conditions. These ties may be removed as soon as a complete ring of members has been assembled.

The strength of the lining may be increased by inserting members of shorter length so that the spirals formed by them are more closely related. Alternatively, a lighter lining may be inserted by using longer length members so that the spirals are more widely spaced. The normal length of a member is a function of $\sqrt{2\pi^2}$.

When the geodetic network is inserted in a road having a circular arch section and straight sides, the semi-circular geodetic canopy can be supported in place by a series of stilts between the joints at the bottom edges of the canopy and the floor. The stilts may be arranged to yield when a predetermined pressure is exerted on the lining.

Advantages claimed for this system are:

1. For a given resistance to ground pressures less weight of steel is required than with standard arches.

2. The segments, being small, light and simple, are easy to handle underground; in particular they

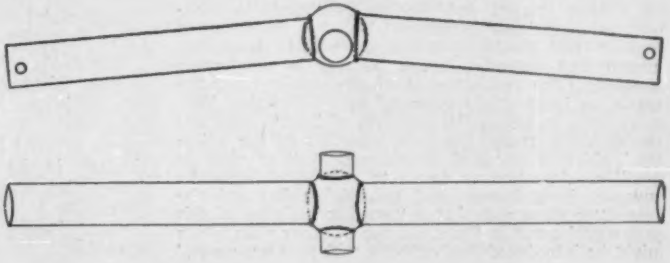


FIG. 2.—TUBULAR SEGMENT, LENGTH 3 FT. 10 IN. AND WEIGHT 35 LB., FOR SWALLOW TUNNEL LINING.

can be inserted as soon as there is room for them without disturbing other operations in the tunnel.

3. The system does not involve the use of bolts, clamps, or any loose fixtures other than pins when adding new members at the open fringe end of the network.

4. Provision is made in the design for flexibility at the joints between members by having the stub pieces a very easy fit into the ends of the abutting members. This slight flexibility also assists to distribute local pressure throughout the network.

5. Owing to the ease with which pieces may be handled and inserted, the costs of transporting and erecting the lining are less than the costs of transporting and erecting arches.

Repairing Damaged Conveyor Belts

ONLY vulcanized repairs will bring damaged conveyor belts back to manufacturing standards and a new technique and a new machine developed by Stenor, Limited, a member of the Firth Cleveland Group, reduces the time required for a small repair to less than 30 min.

The repair kit consists of a Weldbelt vulcanizer, and a set of tools and accessories packed in a carrying case. Repairs can be carried out by one man, and the system is particularly recommended when the belt is operating outside, or in damp or arduous conditions. The system, which is approved by leading belt manufacturers, makes possible a much simpler method of repairing damage, even holes right through the belt, and of repairing the edges of the belt.

The basis of the Stenor system is a re-designed model of the Weldbelt vulcanizer, which has several features which make it of particular interest to conveyor maintenance engineers.

The heating units of the new vulcanizer have been completely re-designed. The effective curing area is enlarged to an 8 in. by 8 in. square, and to each heating unit has been added an 11 in. square base plate. When a repair has to be made by "stepping" the joint, the extended base plate effectively prevents adjacent and previously cured areas being affected. The new heating units are streamlined in appearance and the base plates slightly chamfered.

Edging bars are a new feature of the machine which allow repairs to be carried out to the edge of the belt. Three bars are supplied with the Weldbelt, giving between them a choice of six belt thicknesses from two to seven plies. Adjusting screws enable side pressure to be exerted along the belt. Curing time is reduced to an average of 10 min.

Health Risks in Non-ferrous Foundries

The second report of the Joint Standing Committee on Safety, Health, and Welfare Conditions in Non-ferrous Foundries, published by the Ministry of Labour (HM Stationery Office, 1s. 9d.), is devoted to known and potential health hazards in non-ferrous founding. The committee is of the opinion that the report on known risks prepared by its Technical Sub-committee, to which the question of health risks was remitted, "warrants the close attention of the industry," which it is urged should act on it as soon as possible. Attention is drawn to a medical appendix covering both known and potential risks, and the committee comments that a "good knowledge of this part would result in the avoidance of many risks which might be introduced inadvertently with new processes."

Stirling and Clackmannan Coalfield

LARGE RESERVES OF COAL

COALFIELD Paper No. 2 of the Geological Survey of Great Britain, by W. A. READ, with palaeontology by R. B. WILSON (HM Stationery Office, price 7s.), deals with "The Economic Geology of the Stirling and Clackmannan Coalfield, Scotland Area, South of the River Forth." The publication is the second of the two Coalfield Papers, the first published in 1956, planned to supplement the Memoir on "The Economic Geology of the Stirling and Clackmannan Coalfield," published in 1932.

The Area described is roughly triangular in shape and about 55 sq. miles in extent. Most of it lies within Sheet 39 of the 1-in. geological map of Scotland, but it extends southwards for a short distance into Sheet 31. Its western and southern boundaries are defined by arbitrary lines drawn respectively due south across the Touch Hills, about 4 miles west of Stirling, and due east, about ½ mile south of Loch Coulter. The River Forth forms its north-eastern boundary.

The highest ground is in the west where the Touch Hills rise to over 1,250 ft. above Ordnance Datum. On the north side of the hills the ground falls abruptly towards the Forth forming a steep escarpment, but towards the east it slopes gently downwards towards North Third Reservoir and Loch Coulter. Immediately east of the Touch Hills the prominent but discontinuous escarpment of the Stirling dolerite sill, facing west, runs southwards from Stirling to the eastern shores of Loch Coulter; it attains its maximum height (831 ft.) at Lewis Hill, east of North Third Reservoir. From this escarpment the ground falls gently eastward to the wide, flat plain of the Carse bordering the River Forth. Within the present Area the carseland is broken only by the isolated hill at Craigforth, west of Stirling, and by the Hill of Dunmore and the Hill of Airth in the east.

The city of Stirling lies in the north-western part of the Area. The older part of the city was built on the northern end of the dolerite escarpment, immediately south of the lowest point downstream where the River Forth could easily be bridged, but in more recent years the city has spread onto the flatter land adjacent to the escarpment. Other towns and villages within the Area are Cambusbarron, Saint Ninians, Fallin, Bannockburn, Cowie, Plean and Airth.

The coals of the productive Coal Measures and of the Limestone Coal Group have long been worked in the Area, but the former are now largely exhausted. There still remain, however, large reserves of coal in the Limestone Coal Group, particularly in the eastern part of the field, where the group lies at considerable depth below younger rocks. In recent years also, the Hirst coals in the Upper Limestone Group have attracted increasing attention.

New Year Honours

AMONG the 2,000 men and women to figure in the New Year Honours List are many in the spheres of industry and commerce. Among them are the National Coal Board's deputy chairman, Mr. Joseph Latham, who receives a knighthood, and the well-known industrialist and chairman of the English Electric Company, Limited, Sir George Nelson, who is made a baron.

Details of some of the principal awards, with biographical notes on the recipients, are given below.

VISCOUNT

Baron ROCHDALE, chairman of a number of companies, a director of the Consett Iron Company, Limited, since 1956, chairman of the Cotton Board, a governor of the British Broadcasting Corporation, and a member of the Dollar Exports Council since 1953. He was president of the National Union of Manufacturers from 1953 to 1956.

BARON

Sir GEORGE HORATIO NELSON, a prominent industrialist, is chairman of the English Electric Company, Limited, its associated companies and subsidiaries, and a director of Micanite & Insulators Company, Limited, and Lloyds Bank, Limited. He has held or holds a large number of offices in scientific, technical, and industrial associations and has served on many Government committees. He is a past president and a member of the Grand Council of the Federation of British Industries, a past president of the Institution of Mechanical Engineers, a member of the council of the British Electrical and Allied Manufacturers' Association, a past president and a member of the council of the Institution of Electrical Engineers, a former member of the general board and executive committee of the National Physical Laboratory and the technical committee of Lloyd's Register of Shipping.

Sir George was president of the British Electrical and Allied Research Association and a member of the Professional Engineers' Appointments Board in 1952, when he was also appointed to the Heavy Electrical Plant Consultative Council. He has long had a keen interest in furthering scientific and technical education and is a governor of the Imperial College of Science and Technology, and holds its Hon.DIC, and also of the Manchester College of Science and Technology. He served as president of the British Electrical Power Convention in 1957-58 and the following year was president of the Locomotive and Allied Manufacturers' Association.

Responsible for the manufacture and installation of steam and hydro-electric equipment and electric traction equipments in various parts of the world, Sir George was chief outside engineer and later chief electrical superintendent of the British Westinghouse Company, Limited, before becoming manager of the Sheffield works of Metropolitan-Vickers Electrical Company, Limited, in 1920. He was appointed managing director of English Electric in 1930, and chairman in 1933, relinquishing the former office in 1956.

BARONETS

Mr. DONALD KABERRY, Conservative MP for North-West Leeds since 1950, and joint vice-chairman, Conservative Party Organization, since 1955, is chairman of W. H. Baxter, Limited, engineers, ironfounders, and manufacturers of stone-breaking machinery, of Leeds, and a director of the Yorkshire Dyeware & Chemical Company, Limited.

KNIGHTS BACHELOR

Dr. WILLIAM HENRY GLANVILLE, director of road research of the Department of Scientific and Industrial Research and an authority of highway construction and soil mechanics. He is a member of the committee of the International Association of Bridge and Structural Engineering, the British Standards Codes of Practice Committee, and the board of the British Nuclear Energy Conference. He is a past president of the Institute of Civil Engineers.

Mr. JOSEPH LATHAM, deputy chairman of the National Coal Board, has been associated with the industry since 1935. Educated at Strand Grammar School, Prestwich (Lancs), he qualified as a chartered accountant in 1926 and was in practice for eight years before joining, as liaison officer, Lancashire Associated Collieries, the central coal-selling scheme for the district, on its formation in 1935.

MR. J. LATHAM

He was appointed secretary of Manchester Collieries, Limited, in 1941 and elected to the board of the company in 1943. On nationalization of the industry he was appointed director-general of finance of the National Coal Board and served in this capacity up to the reorganization of the NCB in 1955, when he became a full-time member of the board. In the following January when Sir (then Mr.) James Bowman, the deputy chairman, succeeded the late Sir Hubert Houldsworth as chairman, Mr. Latham was appointed deputy chairman. He is chairman of the Coal Industry Housing Association, deputy chairman of Coal Industry Nominees, Limited, and a director of Benzole Producers, Limited, and an original member of the Clean Air Council since its formation in 1957. Mr. Latham is 54

Mr. JOSEPH FLAWITH LOCKWOOD, chairman of Electric & Musical Industries, Limited, and other companies, and a director of Henry Simon (Hold-

ings), Limited, flour and provender milling engineers and makers of grain siloes, handling plant, etc., of Stockport (Ches). He has been a director of the National Research Development Corporation since 1951. Earlier in his career, Mr. Lockwood, who is 55, was technical manager of Etablissements Henry Simon, Limited, in Paris and Brussels. He was appointed a director in 1933 and subsequently a director of Henry Simon, Limited, Buenos Aires, chairman of Henry Simon (Australia), Limited, and a director of Henry Simon (Engineering Works), Limited. He was appointed chairman and managing director of Henry Simon, Limited, in 1950 and has been chairman of EMI since 1954.

Mr. RONALD PETER MORISON, independent chairman of the executive committee of the British Iron and Steel Federation since 1955, and well known in the field of arbitration. Mr. Morison, who is 59, was called to the Scottish Bar in 1923 and to the English Bar in 1940. He was a member of the Industrial Disputes Tribunal from 1944 to 1954 and in the following year a deputy commissioner under the National Insurance Acts.

Mr. CHARLES FREDERICK TRUSTAM, chief general manager of the Royal Insurance Company, Limited, and a director of British Electrical Repairs, Limited, Manchester, and British Engine Boiler & Electrical Insurance Company, Limited.

Mr. ARTHUR BERTRAM WARING, chairman and managing director of Joseph Lucas (Industries), Limited, and chairman of C.A.V., Limited, Girling, Limited, and Rotax, Limited. He is a director and a member of the Birmingham committee of Lloyds Bank, Limited. Mr. Waring, who is 66, qualified as a chartered accountant in 1920 and joined Joseph Lucas (Industries) in 1922.

ORDER OF THE BATH

CB

Mr. ERNEST JOHN MEADON, Accountant-General and Under-Secretary for Finance, Ministry of Power, since 1955. He was appointed Assistant Principal of the Mines Department in 1934 and was Private Secretary to the Secretary for Mines in 1937-38, being made Principal Private Secretary the following year. He became Assistant Secretary, Ministry of Fuel and Power, in 1942 and was UK delegate to the OEEC Coal Committee from 1948 to 1950, serving as vice-chairman in the latter year. Mr. Meadon, who is 48, was seconded to the National Coal Board in 1950 and returned to the Coal Division of the Ministry in 1953. He was appointed Under Secretary of the Safety and Health Division in 1954.

Mr. ROGER NATHANIEL QUIRK, Under Secretary, Ministry of Fuel and Power, from 1948 to 1952, and now Under Secretary, Office of the Minister for Science.

Mr. ROBERT HENDRY WEIR, Director-General of Engine Research and Development, Ministry of Aviation, and formerly assistant director of the Ministry of Aircraft Production, director of industrial gas turbines, and director of engine research and development. He was educated at Glasgow University and served his engineering apprenticeship with William Denny & Bros., Limited, Dumbarton.

ORDER OF THE BRITISH EMPIRE

Civil Division

KBE

Rear-Admiral Sir MATTHEW SAUSSE SLATTERY, chairman and managing director of Short Bros. & Harland, Limited, aeronautical engineers, Belfast, and until recently special adviser to the Prime Minister on the transport of Middle East oil. Sir Matthew is also chairman of Bristol Aircraft, Limited, S.B. (Realisations), Limited, and a director of the Bristol Aeroplane Company, Limited.

CBE

Mr. STANLEY CHARLES BOND, president of the Traders Road Transport Association, Limited, and transport manager of Stewarts and Lloyds, Limited. He is a member of the Transport Committee of the Council of Ironfoundry Associations.

Mr. DOUGLAS DICKSON CRUICKSHANK, general manager of the Renfrew, Dalmuir, and Dumbarton Works of Babcock & Wilcox, Limited, boilermakers, nuclear plant engineers, manufacturers of cranes and mechanical handling plant, etc. Mr. Cruickshank was for several years, until the partition of India, deputy general manager of the East Indian Railway and subsequently a director of Sir William Arrol & Company, Limited, Glasgow, bridgebuilders and engineers. He was appointed to his present post in 1953.

Mr. LEONARD JOHN DAVIES, director of research and education, British Thomson-Houston Company, Limited, electrical engineers and manufacturers, of Rugby, and of A.E.I. Lamp & Lighting Company, Limited, and Glass Bulbs, Limited.

Mr. NOEL PERCY NEWMAN, chairman and managing director of Newman, Hender & Company, Limited, iron and non-ferrous founders, of Stroud (Glos), and of its oversea associates. He is also chairman of George Clark & Sons, Limited, Parry Pumps, Limited, Shipham & Company, Limited, Vee Reg Valves, Limited, and chairman and managing director of N.H. Engineering, Limited. Mr. Newman is president of the Joint Iron Council, president of the Engineering Employers' West of England Association, and vice-chairman of the British Valve Manufacturers' Association, and served as chairman of the Council of Ironfoundry Associations from 1949 to 1958. Honorary treasurer of the Institute of British Foundrymen, he is a past president of the institute and a member of the council of the British Cast Iron Research Association.

Mr. ALFRED JAMES NICHOLAS, managing director of South Wales Switchgear, Limited, is also joint managing director of Aberdare (Holdings), Limited. He is a member of the boards of Aberdare Cables, Limited, Electric Switchgear Montreal (1953), Limited, Neptune Brass & Aluminium Company, Limited, and Treforest Electrical Services, Limited. He was the 1958-59 president of the South Wales branch of the Incorporated Sales Managers' Association and is an original member of the Development Corporation for Wales.

Mr. HAROLD ERNEST PEIRCE, a managing director of Hall & Company, Limited, builders' and coal merchants, of Croydon (Surrey), and chairman of the executive council of the National Council of Building Material Producers. Mr. Peirce is also chairman of the Sand and Gravel Association of Great Britain, and a director of a number of companies in that field.

Mr. HUMPHREY THOMAS PLEDGE, Keeper of the Science Museum, South Kensington, since 1945.

Mr. HENRY THOMAS RAMSAY, director of the Safety in Mines Research Establishment, Ministry of Power, since 1955. Mr. Ramsay, who is 52, graduated from London University and served for much of his career under Sir Clifford Patterson at the research laboratories of the General Electric Company, Limited. His work on the application of the discharge in gases to high-voltage rectification led to valuable research on radar. After five years at the Royal Aeronautical Establishment he joined the Ministry of Supply and in 1955 took up his present work with the then Ministry of Fuel and Power.

Ald. BERTRAM RAMSEY, chairman of the Middlesbrough Education Committee, is a steelworker and has held national office with the British Iron and Steel and Kindred Trades Association. He has been a member of the Town Council since 1928 and is chairman of the executive of the Northern Counties Technical Examination Council.

Mr. WILLIAM SHEPHERD ROBERTSON, chief executive officer of the Scottish Council (Development and Industry).

Mr. HENRY ARTHUR JOHN SILLEY, chairman of R. & H. Green & Silley Weir, Limited, dry dock owners, London, E.C.3, and a director of Silley Cox & Company, Limited, engineers, brass and iron founders, shiprepairers, etc., of Falmouth (Cornwall).

OBE

Military Division

Acting Wing Cmndr. CECIL EWART WHITAKER, RAFVR (Training Branch), a local director of Jessop-Saville, Limited, special steel manufacturers, of Sheffield, and formerly of the English Steel Corporation, Limited. Wing-Cmndr. Whitaker, who is 62, has been associated with training Yorkshire air cadets for the past 18 years.

OBE

Commonwealth Relations Office

Cllr. ALBERT LESLIE BACKWELL, former mayor of Geelong City, Victoria, Australia, and a well-known foundryman of Geelong.

OBE

Civil Division

Mr. HAROLD EDWARD BARRY, manager, trade relations department, head office of Shell-Mex & B.P., Limited.

Lt.-Col. THOMAS SMITH GIBSON, chairman and managing director of A. & J. Main & Company, Limited, structural engineers, etc., of Glasgow; Mr. WILLIAM ERNEST GOWERS, a director and general manager at the Cwmbran Works of Girling, Limited, makers of brakes for road vehicles and aircraft, of Birmingham, until his retirement in November, and a member and past chairman of both the East Wales Productivity Council and the Newport and Pontypool Productivity Committee.

Mr. ANDREW EDWARD HAHN, who is 53, has been secretary of Sheffield Chamber of Commerce since 1945 and reintroduced the Chamber of Commerce journal, Quality, as Quality of Sheffield; Mr. JOHN SHERWOOD HALES, director of the industrial and domestic development laboratories of the British Coal Utilization Research Association; Mr. HENRY JOEL HAMBLIN, Senior Principal Scientific Officer, National Institute of Agricultural Engineering.

Mr. PERCY MYNORS HOLMAN, chairman and joint managing director of Holman Bros., Limited, mining, quarrying, and pneumatic plant specialists, etc., of Camborne, and a director of its oversea subsidiaries, managing director of Climax Rock Drill & Engineering, Limited, and a director of Cornwall Drop Stamping Company, Limited, Dustuctor Company, Limited, and Goodyear Pumps, Limited. Mr. Holman was chairman of the Cornwall District Advisory Committee of the South Western Regional Board for Industry from 1948 to 1958. He is a vice-president of the Engineering and Allied Employers' West of England Association.

Mr. PERCY GUY HORSLER, Superintending Inspector of Factories, Ministry of Labour; Mr. JOHN OWEN PARRY, principal of the firm of J. Owen Parry & Lewis, consulting civil engineers, of Ammanford (Carmarthenshire), and chairman of the Ammanford and District Local Employment Committee.

Mr. ALFRED WALTER PLAYER, managing director of Fleming & Ferguson, Limited, ship and dredger builders and marine engineers, of Paisley (Renfrewshire). He received his technical education at the Royal College of Science and Technology, Glasgow, and has been with Fleming & Ferguson for more than 30 years. He has been managing director for the past 12 years.

Mr. ERNEST JAMES SCOTT, for services to water polo. Mr. Scott is a director of Bluemel Bros., Limited, Coventry, and Dover, Limited, Northampton, both motor and cycle accessory manufacturers; Mr. ALEXANDER SYMON, manager (sales engineering), Bristol Aircraft Company, Limited; Mr. ERIC JOHNSON TIMBERLAKE, joint managing director of Electro Dynamic Construction Company, Limited, makers of revolving machinery and control gear, of St. Mary Cray (Kent).

Mr. JAMES EDWARD WHITTAKER, area manager of the North of Scotland Hydro-Electric Board and a past chairman of the Scottish Centre of the Institution of Electrical Engineers; Mr. ERNEST THOMAS WILKINS, principal scientific officer, Department of Scientific and Industrial Research; Mr. ANDREW WILSON, principal executive officer, lately regional director (North Western Region), Ministry of Power.

MBE

Mr. ALARIC ALLEN, chief development engineer, Cossor Radar & Electronics, Limited, Harlow (Essex); Mr. HENRY WILLIAM ATKINSON, senior executive officer, National Physical Laboratory, Department of Scientific and Industrial Research; Mr. JOHN BELL, area organizer, No. 2 Area (North-Eastern District), United Patternmakers' Association; Mr. JOSEPH HERBERT BROOKS, superintendent of engineering workshops, Cambridge University; Mr. WILLIAM BULLOCH, works director of Cruikshank & Company, Limited, cast-iron, steel and small malleable castings manufacturers, of Denny (Stirlingshire).

Mr. ALFRED GEORGE WHICHELOE CANNON, manufacturing manager of the motor and control gear division of Associated Electrical Industries, Limited, Rugby. He served his apprenticeship at the Rugby works of the British Thomson-Houston Company, Limited, became a draughtsman at the Birmingham works in 1920 and manager in 1951. He has been with AEI for the past six months. Mr. Cannon is also a director of the Hilltop Foundry Company, Limited, Wednesbury (Staffs).

Mr. ALEC DRAPER, vice-principal of Rugby College of Engineering Technology and a past-president of the Rugby Engineering Society; Mr. JAMES BRYSON HARDIE, honorary secretary of the savings group of Wm. Thom-

son & Company (Kinning Park), Limited, Glasgow pulley block makers; Mr. EDWARD JOHN HOCKING, electrical manager, Vosper, Limited, shipbuilders' engineers, Portsmouth.

Mr. JOHN TAYLOR IMRIE, drawing office consultant, Fairfield Shipbuilding & Engineering Company, Limited, Glasgow; Mr. JOHN VICTOR JONES, chief information officer, B.P. Refinery (Kent), Limited; Mr. CHARLES MACDONALD, a director and general contracts manager of Wailes Dove Bitumastic, Limited, Hebburn (Co. Durham), who has been with the firm since 1913, carrying on a family association which started in 1886, his father having been assistant managing director.

Mr. JOHN HENRY LANE-NOTT, Civil Defence officer, Steel Company of Wales, Limited (Newport division). Mr. Lane-Nott, who is 39, was formerly with the Bristol Aeroplane Company, Limited, and joined the Orb Works staff of SCOW in 1945. He became planning engineer for the Newport Division and in 1952 was appointed to his present post.

Mr. MICHAEL DIXON PARKINSON, head of the estimating department of T. W. Greenwell & Company, Limited, ship, engine, and boiler repairers, of Sunderland; Mr. WILLIAM GEORGE DURBAN PHILLIPS, senior executive officer, Ministry of Power.

Mr. JOHN RINGLAND, assistant manager, electrical department, Harland & Wolff, Limited, Belfast shipbuilders and engineers; Mr. RICHARD LLEWELLYN LLOYD ROBINSON, regional fuel engineer, National Industrial Fuel Efficiency Service; Mr. DAVID RODGER, manager of the marine department of Vickers-Armstrongs (Engineers), Limited, Barrow-in-Furness; Mr. ERNEST EDMUND SOPP, officer-in-charge, Central Drawing Office, Ministry of Power; Miss WINIFRED MARY SPRINGFORD, principal secretary to the chairman, Imperial Chemical Industries, Limited; Mr. ERNEST CHARLES JOSEPH STUCHBERY, works manager, Mechanism, Limited, scientific and aero engineers, of Croydon (Surrey); Mr. JOSEPH ALFRED THOMPSON, manager of Hylton Colliery, Durham Divisional Coal Board; Mr. WILLIAM EDGAR WILLIAMS, principal assistant to the Secretary, Bristol Channel Ship Repairers' Association.

BRITISH EMPIRE MEDAL

Mr. JABEZ BARRIE ATHERTON, electric welder, Billingham division of Imperial Chemical Industries, Limited, Middlesbrough; Mr. WALTER NORMAN COLEMAN, overhead crane driver, Dorman Long (Bridge & Engineering), Limited, Middlesbrough; Mr. JAMES FORTESCUE CONNOLLY, senior foreman, Davidson & Company, Limited, Belfast engineers and ironfounders; Mr. HUGH CONNOR, senior deck plater (marker), Joseph L. Thompson & Sons, Limited, Sunderland, shipbuilders; Mr. WILFRED DICK, instructor, Ashington Colliery, Northern (N & C) Divisional Coal Board; Mr. WALTER EATON, faceworker, Shirland Colliery, East Midlands Divisional Coal Board; Mr. GEORGE HENRY EGGERTON, back ripper, Wolstanton Colliery, West Midlands Divisional Board, delegate to the Midlands Council of the NUM, union branch secretary and member of North Staffordshire Miners' Welfare Committee.

Mr. JOHN GUNTER, surface labourer, Kay and Garn Slopes Colliery, South-Western Divisional Coal Board, a miner for 51 years, a Brecon County Councillor and a member of the Welsh University Board; Miss OLIVER MARY HADLEY, collector, North Warwickshire Colliery Savings Group, Polesworth; Mr. JOHN HATHAWAY, supervisor, S. M. Wilmot & Company, Limited, metal structural and fabrication engineers, of Bristol; Mr. ALEXANDER HOOK, foreman, Brown Bros. & Company, Limited, hydraulic engineers and brassfounders, of Edinburgh; Mr. THOMAS HENRY HUNT, heavy foundry superintendent, F. H. Lloyd & Company, Limited, Wednesbury (Staffs); Mr. HENRY GEORGE JARVIS, chief stillman, Carless, Canel & Leonard, Limited, petroleum and coal tar naphtha distillers, of London, E.3; Mr. HENRY JORDAN, assistant foreman, Harland & Wolff, Limited, Belfast engineers and shipbuilders.

Mr. GEORGE EDWARD KENT, welfare liaison officer, Robert Stephenson & Hawthorns, Limited, locomotive builders, Newcastle-upon-Tyne; Mr. ERNEST MANN, training officer, Nook Colliery, North-Western Divisional Coal Board; Mr. JOHN COOK MATHIESON, foreman, Carron Company, ironfounders and engineers, Falkirk; Mr. JOHN NICHOLSON, boilermaker's plater, Leeds & Bradford Boiler Company, Limited; Mr. THOMAS ORMEROD, foreman engineer, Grayson, Rollo & Clover Docks, Limited, shiprepairers, dry-dock owners, etc., of Liverpool.

Mr. JAMES BOWDEN RAITT, progress chaser, Keith Blackman, Limited, engineers and manufacturers of fans, gas heating apparatus, etc., of London, N.17; Mr. GEORGE BELL RICHARDSON, gas welder, Ashmore Benson, Pease & Company, Limited, makers of blast furnaces, gasworks plant, etc., of Stockton-on-Tees; Mr. WILLIAM ROBERT ROWE, foreman, Whites Shipyard (Southampton), Limited; Mr. JOHN SCOTT, slipway foreman and rigger, Herd & Mackenzie, shipbuilders, marine and general engineers, of Buckie (Banffshire); Mr. THOMAS SHEVLIN, salvageman, Chislet Colliery, South-Eastern Divisional Coal Board; Mr. HARRY SMITH, shift superintendent, British Aluminium Company, Limited; Mr. HAROLD SWINDELL, patternmaker and for 40 years an employee at the Stanton Ironworks Company, Limited; Mr. ERNEST TAYLOR, foreman, Automatic Telephone & Electric Company, Limited, Liverpool; Mr. JOSEPH TAYLOR, checkweighman, South Pelaw Colliery, Durham Divisional Coal Board; Mr. CHARLES EDWIN WRIGHT, collector, Works Savings Club, Palmers Hebburn Works of Vickers-Armstrongs (Shipbuilders), Limited.

Mining Qualifications Board

THE next Mining Qualifications Board Examination for first- and second-class certificates of competency as manager and undermanagers of mines will be held on May 17, 18, and 19, at Glasgow, Sunderland, Doncaster, Wigan, Cardiff, and Stoke-on-Trent. Candidates for limited certificates of competency as managers and undermanagers of stratified ironstone mines will attend at the Doncaster centre.

The mining legislation examination for mechanical engineer's certificates, electrical engineer's certificates, mechanic's certificates Class 1 and electrician's certificates Class 1 will be held at the above centres on May 17. The written part of the examination for certificates of qualification as surveyors of mines will be held at the above centres on May 18 and the oral and practical examinations in July.

Holders of the higher national certificate in mining surveying, or applicants who have passed the intermediate examination of the Royal Institute of Chartered Surveyors and are, therefore, exempt from the written examination, must submit their applications not later than March 23.

Intending candidates should apply after February 22 for the necessary forms, stating whether they have previously attended an examination for any of the above certificates. The completed applications should be returned to the secretary as soon as possible, and must in any event be received not later than March 23. Letters should be addressed to the Secretary, Mining Qualifications Board, Ministry of Power, Thames House South, Millbank, London, S.W.1.

US Consortium Wins $30,000,000 Contract

SAID to be the biggest financial deal US private enterprise has had with Russia since before the war, the Intertex Group of New York has won a contract to build and equip a textile factory for the USSR worth about $30,000,000 (£10,000,000). The group, an American consortium, secured the contract in the face of keen British competition.

The UK combine, Textile Machinery Manufacturers, Limited, tendered a price 20 to 30 per cent. lower than the American figure and offered three- to five-year credits. The Americans offered no credit and claim that "a higher rate of productivity" of their equipment won the contract.

Company News

Twelfth Year Landmark

SCOW's CONTINUED GROWTH SINCE 1947

IT is 12 years since the Steel Company of Wales, Limited, the youngest of the great British steel plants, first began to sprout from the sand dunes of the Glamorganshire coast near Port Talbot and the annual report for the year to October 3, 1959, therefore, is somewhat of a landmark in the company's history, presenting as it does, a picture of continuous growth. The original plan for an integrated steelworks with hot and cold rolling mills was started in 1947 and completed in 1951 at a cost of some £70,000,000. Since then successive development plans have steadily raised output of steel ingots and the company's end products.

During the past financial year SCOW's investment in fixed assets passed the £200,000,000 mark and its production of steel ingots—in 1951 640,000 tons—reached 2,324,000 tons. By the end of the current year the annual rate of production should be running at 3,000,000 tons. The third development plan designed to produce this output is all but completed and the fourth development plan is already in active preparation.

In his annual statement, the chairman, Mr. Harald Peake, says that this plan is devised to increase ingot production to 3,650,000 tons and its central feature will be the erection alongside the present 80-in.-wide hot strip mill of a smaller 48-in.-wide hot strip mill to free the wide mill for rolling the extra quantities of sheets urgently needed by the motor-car industry. The greatest merit of the new plan is that it could start to produce sheets and tinplate by the end of 1961.

Trading profit in the past year was a record at £23,291,000, of which £6,646,000 was provided for depreciation and £2,650,000 placed to plant depreciation reserve. While nearly £17,000,000 was spent during the year on new plant and fixed assets it was only necessary to raise £6,500,000 by further borrowing.

This came from the Iron and Steel Holding and Realization Agency to which the company now owes a total of £23,000,000 (out of an authorized maximum of £40,000,000) which is repayable by the end of 1964. The estimated cost of the fourth development plan—£33,000,000—can, Mr. Peake thinks, be met from internal sources and temporary bank borrowings.

The final dividend of 1s. 3d. brings the total dividend to 2s. (1s. 9.6d. including a special interim).

PEERLESS & ERICSSON, LIMITED, manufacturers of food preparing machinery, of London, N.W.9—The merger between the company and the Kenwood Manufacturing Company, Limited, has been completed.

WILLIAM WARNE (HOLDINGS), LIMITED, rubber manufacturers, of Barking (Essex)—The company is to acquire all the capital of the Heston Rubber Company, Limited, and Heston Rubber Products, Limited, both of Hengoed (Glam).

ARMSTRONG, STEVENS & SON, LIMITED, dropforgers and machinists, of Birmingham—In response to the offer made by the Heenan Group, Limited, to purchase the whole of the 800,800 5s. shares, acceptances have been received in respect of approximately 87 per cent. The date for late acceptance has been extended to January 19.

BAIRD & TATLOCK (LONDON), LIMITED, scientific instrument manufacturers, of Chadwell Heath (Essex)—The offer by Derbyshire Stone, Limited, of nine of its 5s. units for every four of the company's £1 shares has been accepted by holders representing 98.9 per cent. of the capital. It is stated that the balance will be acquired shortly.

STANDARD STEEL COMPANY (1929), LIMITED—The whole of the share capital has been acquired by Metal Propellers, Limited, Croydon (Surrey). Mr. C. Colley, managing director of Metal Propellers, has been appointed managing director of the company and Mr. D. R. Morgan, who will continue as a director, has been appointed general manager.

TAP & DIE CORPORATION, LIMITED—The creation of 6,000,000 ordinary 5s. shares is proposed, increasing the capital to £3,000,000. A rights issue is being considered to provide funds for further expansion and to replace part of the corporation's cash resources absorbed in the acquisition of International Twist Drill Company, Limited, Sheffield, shares.

HALL & COMPANY, LIMITED, coal and building material suppliers, of Croydon (Surrey)—Dealings are due to start on January 18 in a 5¼ per cent. unsecured loan stock, 1980-85. A placing is being made of £1,500,000 of the stock at £98½ per cent., free of stamp and commission, for payment as to £50 per cent. on January 15 and of £48½ per cent. on July 1. Stock is now being placed through the market at a price of 99.

C. & J. HAMPTON, LIMITED, manufacturers of engineers' and woodworkers' tools, of Sheffield—The directors recommend a final dividend for the 15 months ended September 30 of 7½ per cent. With the first and second interim dividends already paid this makes 22½ per cent. (15 per cent. for previous year), payable February 17. There is to be a one-for-two scrip issue. The new ordinary shares will rank for dividends declared subsequent to February 16, 1960.

BROOM & WADE, LIMITED, manufacturers of air compressors, pneumatic tools, etc., of High Wycombe—Orders for all the company's products stand at a high level, says the chairman, Mr. H. S. Broom. Every

effort is being made, both at home and oversea, to maintain this satisfactory position and the outlook appears promising. In the year ended September 30, 1959, the company's turnover increased by 15 per cent., but the stocks to support this rose by only 8 per cent. This was brought about by much closer material and stock control in the parent company, a further effect of which was the improvement in cash resources. At home, to meet the increased demand, all departments were under considerable pressure, but by improved factory layout and production control a substantial increase in output was achieved.

CORK MANUFACTURING COMPANY, LIMITED—Following an earlier statement that the board understood that a firm of merchant bankers had been asked to advise Engineering Components, Limited, Slough (Bucks), on an offer for the company's shares, it was stated on Wednesday night that no offer will now be made.

MIDLAND BRIGHT DRAWN STEEL & ENGINEERING COMPANY, LIMITED—The directors propose a one-for-one scrip issue followed by the consolidation of the 1s. shares into shares of 2s. each. The chairman, Mr. H. Hipkiss, says that so far this year the buoyancy of trading and profits which commenced in April, 1959, is continuing. A good start has been made by the company and given reasonable trading conditions, the chairman sees no reason why this year should not be as successful as last.

ATLAS STEEL FOUNDRY & ENGINEERING COMPANY, LIMITED—The chairman, Mr. A. C. Strathie, states that orders are not coming in as fast as work is going out. There is keen competition for the reduced tonnages available to the steelfounding industry and heavy downward pressure on prices with consequent lower profit margins. Fixed assets appear at £457,344 (£88,983), reflecting the April revaluation. Commitments in connection with a new blast furnace to be started up in a few months' time total £80,000.

BUTLER MACHINE TOOL COMPANY, LIMITED—The chairman, Mr. J. W. Butler, states that the main reason for the fall in trading profits to £135,307 (£200,042) was a decline in output due to the production of an unusual number of new design machines and considerable alterations to the company's standard products to ensure that they were completely up to date. The order-book has declined sharply over the past 18 months, but it still remains at a high figure, although output is stated to be affected by the unbalanced intake of new orders.

WILKES BERGER ENGINEERING COMPANY, LIMITED—The offer by Union Corporation, Limited, to purchase from shareholders all or any of their shares has been accepted to the extent of approximately 89 per cent. of the shares in respect of which the offer was made. In accordance with the terms of the agreement made with Mr. M. M. Berger, joint managing director, last month, when Union Corporation and Bay Hall Trust, Limited, acquired a controlling interest in the company, Mr. Berger has reacquired 50,000 shares previously made available by him.

LANCASHIRE DYNAMO HOLDINGS, LIMITED—The directors have received the offer from Metal Industries, Limited, and are giving it their full consideration. A considered statement will be made as soon as possible. Terms of the offer are £4 new ordinary stock in Metal Industries plus 30s. in cash for every £5 ordinary stock in the company. If the offer is accepted stockholders will be paid a dividend of 10 per cent. to cover the period to the end of March. Metal Industries is also offering £6 new 5 per cent. preference stock for every £5 of Lancashire Dynamo 5½ per cent. preference stock.

South Durham Steel & Iron Dividend Policy

IN his statement with the annual report and accounts of the South Durham Steel & Iron Company, Limited, Mr. B. Chetwynd Talbot, chairman and managing director, says that during the current financial year there will be a further increase in the depreciation provision and a considerable increase in interest charged. The ordinary capital, he says, can be raised through conversion of debentures. Such new ordinary would receive both the interim and final dividends.

After taking these factors into consideration, together with the possible effect of the "cloud" which has not yet cleared over the level of production of the heavy section of the steel industry, the directors decided it would not be prudent to increase the dividend.

Capital expenditure, including routine expenditure incurred by the company during the year ended October 3, 1959, amounted to £19,760,000, of which some 32 per cent. was secured from the company's resources. Estimated capital commitments outstanding at balance-sheet date are estimated at £26,860,000, of which £26,390,000 has been authorized on the third stage development for the completion of the South Works at Greatham, in addition to which there is the anticipated increase in working capital required. Commitments still to be expended on the second stage of the developments of the North Works at West Hartlepool amounted to £472,524.

Capital expenditure during the year on the South Works totalled £17,200,000, making £22,270,000 expended on that scheme over the past three years out of a total expenditure forecast of £48,660,000. The balance of £26,390,000 will be largely expended over the next two years.

Mr. Talbot states that progress made has come up to expectations. The company is still engaged on a scheme of major development which will, on completion, make it the largest producer of steel plates in the United Kingdom.

Capital Spending by Thos. Firth & John Brown Group

DURING the year ended September 30, 1959, the Thos. Firth & John Brown, Limited, group of steelmakers, spent £1,648,960 on land, buildings, plant, and machinery, over £1,100,000 being spent by the parent company and £480,664 by the subsidiary, William Beardmore & Company, Limited. In his annual review the chairman, Sir John Green, states that the total estimated cost of completing the various capital schemes on hand is approximately £2,750,000, of which commitments already entered into amount to £1,031,000.

Sir John cannot foresee any improvement in demand in the near future for heavy forgings and castings from the shipbuilding industry and the demand for forgings from the electrical generating plant manufacturers is still poor. On the other hand there has been an improved demand for bars and billets and manufacturing capacity in that field is fully occupied.

The group net profit of £2,317,280 compares with £2,448,570 to which is added unrequired tax provisions of £350,000 (nil). The equivalent dividend of 9.2 per cent., compares with 8 per cent. previously.

THE COAL TRADE

WITH the New Year holiday over, demand for fuel for industrial purposes may be expected to rise appreciably. Many of the large consumers in heavy industry are extremely busy and their fuel requirements are likely to be correspondingly high. On the domestic side, mild weather brought an end to the fairly brisk demand which developed before Christmas, and trade during the past week generally has been rather quiet despite lower temperatures.

WEST MIDLANDS

The demand for house coal is fairly strong and widespread, the pressure being greatest in respect of the middle and lower grades. Some of the higher-priced coals are not too difficult to secure. Supplies of the better known manufactured fuels are very scarce and limited deliveries are mostly supplied against orders. Little is being done in domestic slack.

Orders for anthracite coals are now subject to considerable delays. Few merchants have much in the way of stock and deliveries are not coming through at all promptly. Best stove nuts, beans, and grains are the most difficult lines, some of the poorer qualities of anthracite being a little easier. Supplies of boiler nuts are about equal to the order-book position, while "Phurnacite" and other special-purpose fuels are not subject to much delay. Coke is now being ordered in increasing quantities.

Industrial demand for singles and doubles has improved, indeed, some delay in loading merchants' vehicles is taking place. There is, of course, little difficulty in securing all the supplies of boiler fuel required and most manufacturers have suitable stocks in hand.

Blast-furnace coke moves freely from the ovens, while a welcome improvement is being felt in the demand for general engineering qualities. Hard coke nuts are still difficult to move and unless the space-heating load becomes much heavier, stocking will be necessary at producing centres. Foundry coke continues to be one of the best market features, and buyers are still not always able to secure all their supplies in their nominated brand.

Askern Colliery Transfer Deferred

THREE-MONTH stay of transfer of 130 men from Askern Colliery, near Doncaster, to two nearby pits has been granted by the North-Eastern Divisional Coal Board.

Mr. W. H. Sales, chairman of the board, said it was to give colliery NUM branch officials time to iron out the difficulties. He was speaking at a meeting on Tuesday with Mr. Alwyn Machen, president of the Yorkshire Area of the NUM, and other board and union representatives.

At the meeting were two of the many miners from Thorne Colliery who were transferred to Askern three years ago when their own pit was closed for repairs. They expressed anxiety that with the closure of Askern's Flockton Seam they would be the first to leave. Many of the 2,300 at Askern feel that the men from the closed-down seam should be sent elsewhere to avoid swelling the already large "market" pool of spare labour.

The number of men to be transferred from Dearne Valley Colliery to the neighbouring Houghton Main Colliery is now officially given as 50 not 100. The transfers will take place over a period.

Over 4 per Cent. Less Coal in 1959

FOR the 52 weeks ended January 2 coal output amounted to 206,101,200 tons, compared with 215,822,100 tons in 1958, an overall drop of 4.5 per cent. Deep-mined output at 195,267,800 (201,475,100) tons was cut by 3 per cent. and open-cast output at 10,833,400 (14,347,000) tons, by as much as 32 per cent.

There was another drop in distributed stocks in the week ended December 26; undistributed stocks fell by nearly 300,000 tons, giving a total fall of nearly 1,000,000 tons. Consumption showed an expected decline, but was still 1,304,000 tons above production, indicating that the adverse coal balance is gradually being redressed.

There were 640,600 wage-earners on colliery books on December 26, against 687,400 on December 27, 1958, the numbers engaged at the coal face being 247,900 and 270,900, respectively. Total absenteeism (all workers) in the week ended December 26, was 15.21 per cent., compared with 21.42 per cent. in the week ended December 27, 1958. Output at the face was 3.793 tons and overall 1.296 in the week ended December 26, compared with 3.557 and 1.215 in the week ended December 27, 1958.

The following table gives (in tons) the output of saleable mined coal by Division in the week ended January 2, and the tonnage lost through all causes (holidays, disputes, and go-slows):—

Division.	Week ended January 2, 1960.		Week ended January 3, 1959.
	Total output.	Tonnage lost.	Total output.
Scottish ..	225,500	158,400	148,900
Northern (N & C) ..	190,200	52,600	163,800
Durham ..	347,800	120,000	329,600
North-Eastern ..	551,400	9,300	688,400
North-Western ..	182,100	70,700	209,700
East Midlands ..	752,800	31,400	812,900
West Midlands ..	272,800	—	298,300
South-Western ..	375,800	2,000	402,100
South-Eastern ..	26,200	—	26,700
Great Britain—			
Deep-mined coal ..	2,924,600	444,400	3,080,400
Open-cast coal ..	98,300	—	163,200
TOTAL ..	3,022,900	444,400	3,243,600

METROPOLITAN-CAMMELL CARRIAGE & WAGON COMPANY, LIMITED—Mr. C. G. Wallace and Mr. W. Scott, secretary and chief accountant, respectively, have been appointed to the board. Mr. Scott has been appointed joint secretary with Mr. Wallace, but will continue as chief accountant.

Appointments

West Midlands Coal Board Promotion

MR. H. D. SAVIOUR, who has been divisional planning engineer of the Warwickshire Area of the West Midlands Divisional Coal Board since May, 1956, has been appointed to the post of deputy Area production manager (planning) in the same Area. He will take up his new duties on February 1.

Prior to his present appointment Mr. Saviour was Area planning engineer in No. 6 Area, East Midlands Divisional Coal Board.

Mr. WILLIAM DICKIE, personnel officer at the Carlisle works of the Metal Box Company, Limited, is leaving to take up another appointment with the company at Mansfield.

Mr. B. J. WEST has been appointed secretary of Stone-Platt Industries, Limited. He succeeds Mr. H. T. Loveland, who has retired and also from the board of Platt Bros. & Company, Limited.

Mr. E. MCGANN, formerly general manager of Don Valley Engineering Company, Limited, Doncaster, has joined W. J. Jenkins & Company, Limited, Retford (Notts), as chief engineer of its coal preparation division.

Mr. GEORGE GIBSON has been appointed head of pensions and insurance of the East Midlands Divisional Coal Board. This is in addition to his appointment as divisional insurance manager of the West Midlands Divisional Coal Board.

Mr. MICHAEL CLAPHAM, joint managing director of the metals division of Imperial Chemical Industries, Limited, has been appointed chairman of the division in succession to Dr. Maurice Cook, who has retired from the company's service. Mr. G. A. D. SMITH has been appointed managing director of the division.

Mr. J. S. BAILLIE, deputy chairman of Harland & Wolff, Limited, the Belfast ship builders and repairers, has been appointed to the boards of A. & J. Inglis, Limited, shipbuilders and engineers, and D. & W. Henderson, Limited, shiprepairers, both of Glasgow. He succeeds Mr. J. R. Lee, who has resigned on account of ill-health.

Mr. J. W. DAVIES has been appointed representative for the Sheffield area of Wakefield-Dick Industrial Oils, Limited, in succession to Mr. A. S. Watson, who retires after 35 years in a similar capacity. Mr. Davies, who is 35, was formerly with the Davy & United Engineering Company, Limited, Sheffield, as engineer in charge of the lubrication department.

Following eight years as rescue station superintendent in the South Staffordshire and Shropshire Area of the West Midlands Divisional Coal Board, Mr. S. BLOOR has been appointed rescue station superintendent of the North Staffordshire Area. He took up his new duties last Friday. Before 1951 Mr. Bloor was assistant rescue station superintendent at Stoke.

Mr. E. CHATTERTON has been appointed engineering consultant to the Coventry Victor Motor Company, Limited, Coventry. In collaboration with the chairman, Mr. W. A. Weaver, he will assume full responsibility for all enginering aspects of the company's business. Mr. Chatterton is well known in the diesel engine world as the designer of the Nomad and Deltic engines.

Mr. W. H. WENTWORTH PING, sales development manager, Firth-Vickers Stainless Steels, Limited, Sheffield, has been appointed general sales manager, responsible to the managing director, for co-ordinating the sales departments of all branches of the company's business. Mr. A. G. CLEGHORN, superintendent, polishing works, has been appointed assistant general manager at the Blackheath Works.

Sir JOHN ERSKINE, who is chairman of the Fairfield Shipbuilding & Engineering Company, Limited, Glasgow, and a director of Lithgows, Limited, shipbuilders, of Port Glasgow, and a number of other companies, has been appointed by the Secretary of State for Scotland to be deputy chairman of the North of Scotland Hydro-Electricity Board for the next two years. He succeeds the late Sir Hugh Mackenzie.

Mr. C. R. PINNELL has been appointed deputy chairman and Mr. R. H. H. EDGCUMBE managing director of William Warne & Company, Limited, rubber manufacturers, of Barking (Essex). Mr. R. J. FARRIER has been elected to the board. Mr. K. N. JEFFERY has been appointed managing director of the St. Albans Rubber Company, Limited. Both companies are subsidiaries of William Warne (Holdings), Limited.

Mr. GERRY WAPLINGTON, who for some 10 years has been with Ex-Cell-O Corporation (Machine Tools), Limited, Leicester, with whom he has latterly been chief engineer, has been appointed technical adviser to Ex-Cell-O (India), Limited. He flies out to take up his new post at the end of the month. Prior to joining the Ex-Cell-O Corporation he was for some 17 years with A. A. Jones & Shipman, Limited, Leicester.

Mr. D. SMITH, for some time manager of Bretby Colliery (Derbyshire), has been appointed manager of Merrylees Colliery (Leics) to succeed Mr. ARTHUR SUMMERS, who becomes manager of Rawdon Colliery (Leics). From Rawdon, Mr. H. C. REID moves to another managerial post at Snibston Colliery (Leics), where he succeeds Mr. R. PRICE, who becomes manager of Desford Colliery (Leics). Mr. J. H. NORTHARD, manager for some time at Desford, has been appointed an Inspector of Mines in the South Wales Division of the NCB.

E. V. Industrials' Extra-ordinary Meeting

BY a substantial majority shareholders at an extraordinary meeting on Wednesday decided to keep Mr. S. H. Newman, the chairman, and Mr. B. H. Woodall on the board of E. V. Industrials, Limited. The resolution calling for their removal, though not in proper form, was, however, moved by Mr. John Nash on behalf of the Kettering Investment Company, Limited, who said that in common with many shareholders they were absolutely dismayed at the lack of information given to shareholders by the board following its rejection of the two most recent offers for the company's ordinary shares.

Replying to the resolution, Mr. Raymund Ball, managing director, suggested that much of the trouble had been caused by people "with malicious intentions." He estimated the earnings of the group in the coming year would be in the region of £600,000. There had been some criticism of its acquisition of the Westminster Construction Company, Limited, but since acquisition that company had made profits of £114,000 in the past two months. He believed in the next four or five years Westminster Construction could earn more than £1,000,000 and that it could be geared up to earn profits averaging £250,000 a year.

A proposal to increase the borrowing powers of E. V. Industrials was passed with comparatively little opposition.

Personal

AEI Chairman's Visit to India

AT the invitation of the Indian Government, Viscount CHANDOS, chairman of Associated Electrical Industries, Limited, is visiting India to see some of the projects in which Britain is helping industrial development in the country. He left for India by air yesterday (Thursday) and will return on February 2, after having travelled many thousands of miles.

He will have meetings with the President of India, Dr. Rajendra Prasad, and the Prime Minister, Mr. Nehru, as well as leading members of the Government, and while in Delhi will deliver addresses to the Indian Council of World Affairs, Delhi School of Economics, and the Institute of Public Administration. He will also record a 10-minute talk to be broadcast on All India Radio.

Among industrial concerns which Lord Chandos will visit—besides AEI's associated companies in India—are the Government-owned company, Heavy Electricals, Limited, Bhopal, the Indian Government Locomotive Company, Chittaranjan, the Durgapur Steelworks, in west Bengal, and the ICI polythene factory, Rishra. Lord Chandos is a director of ICI.

The Minister of Power has reappointed Mr. A. H. A. WYNN as a full-time member of the National Coal Board.

Mr. W. A. McLEOD has resigned from Perry Engineering, Limited, and will be returning to the US. The new chairman is Mr. C. T. BAYLISS.

Mr. S. W. BARTLAM has retired after 47 years as export manager of W. Canning & Company, Limited, manufacturers of electro-plating plant, of Birmingham.

Mr. T. L. MARTIN, director and general manager of West Instrument, Limited, Brighton, leaves for the US on Thursday to study the latest American advances in pyrometer techniques.

Sir CHARLES WESTLAKE, chairman of Metal Industries, Limited, and of many other companies, was a passenger in the Uganda, which sailed from London for Mombasa on Sunday.

Mr. G. M. NEWTON and Mr. O. D. ANGELL, directors of the British Vacuum Cleaner & Engineering Company, Limited, Leatherhead (Surrey), have been appointed additional directors of Blundell Bros. (Luton), Limited, dyers, of Luton.

Mr. H. F. PARKER, assistant general manager of No. 5 Area of the East Midlands Divisional Coal Board and the St. John Ambulance Brigade commissioner for that Area, has been promoted to officer of the Order of St. John.

Lord MILLS, who as Paymaster-General is personal adviser on industrial affairs to the Prime Minister, was 70 on Monday. He was Minister of Power before Mr. Macmillan made changes in the Government following the last election.

Mr. T. H. HUNT who has been for over 50 years at the James Bridge Steel Works, Wednesbury (Staffs), of F. H. Lloyd & Company, Limited—for the past four years as heavy foundry superintendent—plans to retire shortly. He joined the firm at the age of 14 and is now 65.

Mr. JOSEPH A. THOMPSON, manager of Hylton Colliery, Sunderland, for seven years, has retired after 50 years in the Co. Durham mining industry. He started his career at Burns Pit, Stanley, in 1911—two years after about 160 men and boys had been killed in an explosion there. He was undermanager at several collieries and before becoming manager of Hylton he was manager of nearby Boldon Colliery for 13 years.

Sir IVAN STEDEFORD, who is chairman and managing director of Tube Investments, Limited, and its subsidiaries, and a director of a number of other companies, has resigned from the court of directors of the Atlas Assurance Company, Limited, in view of his other commitments.

Miss J. R. SHERRIFFS has relinquished her position as secretary of Metal Closures, Limited, West Bromwich, and of its subsidiaries, Johnson Bros. (Closures), Limited, and Plastic Closures, Limited. She remains a director of the three companies. Her successor as secretary is Mr. J. CASSERA.

Mr. FRANK HILLS has retired as technical consultant to the Globe Pneumatic Engineering Company, Limited, Romford (Essex), after serving the company for 53 years. He became technical director in 1931 and was managing director from 1951 to 1956, subsequently serving the board as technical consultant.

Mr. G. F. PAVELING, shop superintendent of the Plessey Company, Limited, general engineers, of Ilford (Essex), has retired after 35 years with the company. Only four other members of the company, including the chairman, Mr. A. G. Clark, have longer service. Mr. Paveling has received presentations from his colleagues and the staff.

Mr. ARTHUR MILLS, export manager of Jessop-Saville, Limited, the Sheffield steelmakers, has retired after 50 years in the steel trade, 46 of them with the firm. During the last war he was with the Ministry of Supply, where he specialized in high-speed steels. According to the company's managing director, Mr. R. P. Wallace, Mr. Mills has brought the company's exports from a war-end lull to a very successful peak.

Mr. G. A. SPARROW is retiring this weekend from the position of secretary of the Leicestershire Colliery Officials' Association. He is 75. He helped to form the Leicestershire branch of the association in 1921 and was elected president a year later. The branch now has a membership of over 600, is the recognized negotiating body for officials in the coalfield, and is allied to the National Association of Colliery Overmen, Deputies, and Shotfirers.

Mr. W. L. SIMS, assistant managing director of Wadkin, Limited, manufacturers of woodworking machinery, machine tools, etc., of Leicester, has been elected chairman of the UK committee which advises on the approvals scheme for electrical exports to Canada. The scheme is operated by the British Standards Institution on behalf of the Canadian Standards Association. Mr. Sims succeeds Mr. D. MAXWELL BUIST, who has been chairman of the committee since its inception nearly 10 years ago.

Lord PLOWDEN, whose term of office as chairman of the Atomic Energy Authority expired on December 31, has been appointed a director of the National Provincial Bank, Limited. He has also taken up his duties as chairman of the British Aluminium Company, Limited, and vice-chairman of Tube Investments, Limited, to which positions he was appointed earlier in 1959. He is also a director of C. Tennant Sons & Company, Limited, merchants and exporters of ferro-alloys, non-ferrous metals, etc., of London, E.C.2.

Mr. LAWMAN WELCH, a member of the executive committee of the British Iron and Steel and Kindred Trades Association, has been invited by the British Iron and Steel Federation to visit New York in June to demonstrate a model of the Ajax oxygen furnace at the British Industries Fair. The Ajax furnace has been

developed by the Appleby-Frodingham Steel Company (branch of the United Steel Companies, Limited), Scunthorpe, where Mr. Welch is employed. The Ajax process has nearly doubled the output of the Scunthorpe company's steel furnaces.

After an association of more than 50 years with the coal, iron, and steel industries, Mr. C. F. SULLIVAN has retired from his post of marketing manager of the coke and by-products branch of the South-Western Divisional Coal Board. Born in Risca, Mr. Sullivan entered the service of Partridge, Jones & John Paton, Limited. After service in the first world war he joined the Blaenavon Company, Limited, and was its sales manager in Cardiff from 1925 until 1938, when he was appointed general manager and later managing director of the firm. He was appointed to the post, from which he has now retired, on nationalization in 1947.

Mr. JOHN RYAN, vice-chairman of the Metal Box Company, Limited, and Mr. EDWARD MEIGH, a director of Glass Technical Services, Limited, London, W.C.1, have been re-elected vice-chairmen of the British Institute of Management. Three new vice-chairmen have been elected. They are Mr. F. W. OAKLEY, a director of the Automatic Telephone & Electric Company, Limited, Liverpool, Mr. J. SANDFORD SMITH, managing director of Harold Whitehead & Partners, Limited, management consultants, of London, S.W.1, and Mr. C. T. WELLS, a director of Fattorini & Sons (Holdings), Limited, badge manufacturers, of Birmingham.

In acknowledgment of "a really brilliant academic career," officials of the Scottish Divisional Coal Board have presented 23-year-old Dr. ALISTAIR H. H. CAMPBELL with a set of mining textbooks. The presentation was made by Mr. G. R. Buchanan, Area general manager of the Lothians Area. Dr. Campbell, who is a mining engineer on a three-year training scheme with the Coal Board preparatory to taking up a senior management post, was awarded a NCB scholarship from Heriot-Watt College and graduated B.Sc. with first-class honours at Edinburgh University, winning the Briggs Memorial Scholarship. He recently gained his Ph.D. degree at the university. He is last year's British Universities golf champion and holds the Lothians amateur championship. At the moment he is working at the coal face at Woolmet Colliery.

Recent Wills

WILLIAMS, JOHN, of Rhyl, retired colliery deputy ... £8,150

CRAWSHAW, MARK, retired iron and steel merchant, of Liversedge (Yorks) £8,641

BINNS, H. N., general manager of the Great Grimsby Coal, Salt & Tanning Company, Limited £23,592

NEWTON, FREDERICK, a founder of Newton Bros. (Derby), Limited, manufacturing electrical engineers £126,150

LANCASTER, H. C., of South Kensington, London, S.W.7, one-time chairman of the Librex Lead Company, Limited £55,354

HOPKIRK, K. E., former director and chief mechanical engineer of the British Thomson-Houston Company, Limited £5,033

SHEAVYN, G. W. I., head of the inventions and patents departments of the Dunlop Rubber Company, Limited £27,683

GLOVER, COL. W. R., honorary president and former chairman of Glover & Main, Limited, London, S.W.1, and a grandson of the founder of Thos. Glover & Company, Limited, gas meter manufacturers and repairers, and a past chairman of the Society of British Gas Industries £278,859

AS FROM JANUARY 1 industrial iron qualities in Austria have been increased in price by an average of 4 per cent., the second and latter part of a rise of 12 per cent. authorized by the Government last summer.

More Pig-iron, Coke, and Iron Ore by United Steel Group

INGOT steel production of the United Steel Companies, Limited, was 2,802,452 tons in 1959, compared with 2,600,401 tons in 1958, an increase of 202,051 tons. Production was not a group record, but individual records were set up by two branches—Appleby-Frodingham with 1,231,605 ingot tons (previous best 1,222,503 tons in 1957) and Samuel Fox with 368,851 ingot tons (previous best 325,416 tons in 1957).

Pig-iron output reached a new high level at 1,822,127 tons, an increase of 153,842 tons over the 1958 figure. This is particularly noteworthy as Appleby-Frodingham was operating only three out of its four blast furnaces for the greater part of the year.

Records were also established during the calendar year for both coke and iron-ore production. Coke output totalled 1,621,460 tons in 1959, against 1,543,167 tons in 1958, while iron-ore production rose from 4,761,422 tons in 1958 to 5,219,572 tons in 1959. Of the latter total, the company's ore-mining branch contributed a record 5,098,962 tons.

Details of the group production in 1959, with the 1958 (53 weeks) figures in parentheses, were:—

STEEL INGOT—Appleby-Frodingham Steel Company, 1,231,605 (1,112,099) tons; Steel, Peech & Tozer, 965,737 (940,149) tons; Samuel Fox & Company, Limited, 368,851 (295,046) tons; Workington Iron & Steel Company, 236,259 (253,107) tons.

PIG-IRON, INCLUDING FERRO-ALLOYS—Appleby-Frodingham Steel Company, 1,404,100 (1,293,040) tons; Workington Iron & Steel Company, 418,027 (375,245) tons.

COKE—Appleby-Frodingham Steel Company, 668,635 (625,950) tons; United Coke & Chemicals Company, Limited, 584,363 (573,209) tons; Workington Iron & Steel Company, 368,462 (344,008) tons.

IRONSTONE—Ore-mining branch, 5,098,962 (4,645,919) tons; Workington Iron & Steel Company, 120,610 (115,503) tons.

World's First Sillimanite-lined Blast Furnace

WORLD's first blast furnace to have a complete Sillimanite stack lining—the Queen Mary of the Appleby-Frodingham Steel Company (branch of the United Steel Companies, Limited)—was lit at the firm's Scunthorpe works recently by Mr. A. Bridge, ironworks engineer.

The stack lining was supplied by General Refractories, Limited, Sheffield, in Sillmax "I" quality, a unique bondless brick manufactured from 100 per cent. natural Sillimanite of the highest purity. Among the physical properties of the refractory are high density, low porosity, high resistance to abrasion and spalling, volume stability at all temperatures likely to be encountered in the lower stack, and high resistance to molten slag, metal, and alkali vapour. The results attained by the lining will be of considerable interest to ironmakers all over the world.

FOR THE FIRST TIME in the company's history, raw steel output of the West German steel concern, Mannesmann, AG, has reached 2,000,000 metric tons a year. During 1959 the monthly rate rose by 15.7 per cent. to some 174,500 tons.

NEWS IN BRIEF

NET PROFIT of $7,200,000 ($4,500,000) or $5.30 ($3.50) per share for the year ended September 30, 1959, is reported by American Steel Foundries. Despite the steel strike, higher profits are likely for the first quarter of the current year, compared with the corresponding period a year ago. New investments are stated to be a record volume of $12,000,000.

REPORTS FROM SYDNEY indicate that in the financial year 1958-59 Australia exported steel worth £A 6,300,000 to Communist China. It was the first time that exports of this kind had taken place. In the same year a trial shipment of 9,000 tons of steel was made from Australia to the Soviet Union, but it is not expected that such steel exports will be continued.

NEWPORT SHIPREPAIRERS, C. H. Bailey, Limited, has acquired a financial interest in the North Dock Engineering Company, Limited, Llanelly. In future North Dock Engineering will handle contracts secured by C. H. Bailey for industrial steel fabrications. It will take over the Newport firm's steel fabrication shop and in addition new plant is to be installed at Llanelly.

WAYS IN WHICH THE Government's information services help exporters were outlined to members of the Australian Association of British Manufacturers on Tuesday during a visit to the headquarters of the Central Office of Information, at Lambeth. They saw the detailed working of the operations by which the COI seeks to explain British achievements in industry to other countries.

WIRE OF UNUSUAL FINENESS is reported to have been developed by the Metallurgical Institute of the Russian Academy of Sciences. Of a diameter of between 1 and 2 microns, the wire is made from melting metal forced under nitrogen pressure through a minute hole bored in an otherwise hermetically sealed container. Using only "a drop" of molten metal the scientists were able to draw over 1½ miles of wire.

THE GENERAL PRODUCTS group of the General Electric Company, Limited, has been reorganized and five new groups have been formed, each under the control of a group managing director. The new groups (with the managing directors' names in parentheses) are:—Domestic equipment (Mr. E. A. Fowler); installation equipment (Mr. R. H. Phillips); lighting and heating (Mr. D. L. Tabraham); Osram (Mr. A. E. Page); radio (Mr. M. M. Macqueen).

FORMED TO ACQUIRE all or part of the business of James Booth & Company, Limited, Birmingham, which consists of the manufacture of wrought aluminium and aluminium products, James Booth Aluminium, Limited, has an initial capital of £100. James Booth & Company is a subsidiary of the Delta Metal Company, Limited, London, S.E.10, which has been negotiating with US Kaiser interests on arrangements for mutual trading and development.

AN ORDER LAID BEFORE Parliament on Thursday of last week by the Secretary of State for Scotland rules that most coal-fired furnaces for use with mechanical stokers may be operated in smoke-control areas provided that smoke is kept to a minimum and only fuels for which the stoker was designed are used. The Order is the Smoke Control Areas (Exempted Fireplaces) (Scotland) Order, 1959, and it applies to furnaces installed or adapted since December 31, 1956.

THE CHEMICAL DIVISION of the Distillers Company, Limited, and the Methylating Company, Limited, introduced reductions in the schedule prices of industrial grades of ethyl alcohol on Monday. Prices of methylated spirits are reduced by amounts ranging from 4d. per gall. for buyers in 2,500-gall. tanker loads to 1d. per gall. for buyers in single 5-gall. drums. For plain British spirit the reduction is 2d. per proof gall. for tanker loads and 1d. per proof gall. for packaged deliveries.

THE ESTABLISHMENT OF trading estates in north Monmouthshire to absorb young men who do not want to enter the mining industry is being advocated by Monmouthshire Federation of Trades and Labour Councils. At its January meeting this move was suggested to help keep alive diminishing mining communities and halt the large-scale population drift to the south. The meeting also agreed that if one of the new car factories is not sited in Monmouthshire efforts should be made to secure a tractor factory for the county.

FULL PRODUCTION FOR some time to come is ensured for Greenwood & Batley, Limited, Leeds, by orders received over the past few months. An order for 60 cold forging machines worth more than £100,000 will be completed over the next two years, there is an order from Sweden for nine machine tools, and a National Coal Board order has been placed for six more electric locomotives as part of modernization schemes underground. Other orders from Scandinavia, Australia, America, and Canada are in hand.

NO FEWER THAN 51 employees of Firth Brown Tools, Limited, Sheffield, received long-service awards of watches or clocks from the Lord Mayor of Sheffield, Ald. A. V. Wolstenholme, himself a former sales representative for Thos. Firth & John Brown, Limited, and associated with Firth Brown Tools until 1946. Fathers of five recipients were employed by the firm and six others have sons working for the company. In the near future 121 employees will be receiving certificates for 25 or more years' service and a further 502 have records of 10 years and over.

Law Cases

PLAINTIFF PARTLY TO BLAME

DAMAGES of £225 and costs were awarded Mr. William King at Birmingham Assizes for injuries received in an accident at the Erdington works of the Erdington Jig & Tool Company, Limited. Giving judgment, Mr. Justice Pilcher said that full damages would have been £900, but he found Mr. King 75 per cent. to blame for the accident.

The judge said that the accident happened when Mr. King's shirt sleeve was caught on a projecting screw of a grinding machine. He was swept off his feet and suffered injuries to two ribs. The company was granted a stay of execution for 28 days pending an appeal.

STEELWORKER, Mr. Thomas Henry Wallace (48), who said that he threw a shovelful of chippings into a furnace at the Hawarden Bridge Steelworks of John Summers & Sons, Limited, and an explosion occurred, spattering him with molten slag, was awarded £252 damages at Chester County Court. The company denied liability. Special damages of £177 were agreed.

Non-ferrous Metals

US Copper Settlement Awaited

THE US copper position is still obscure. It is understood that Kennecott has reached agreement with the International Mine, Mill, and Smelter Workers' Union, but this is not complete. Resumption of mining has taken place on their properties in Nevada, Arizona, and New Mexico, but not in Utah, the most important property. Moreover, Phelps Dodge and Anaconda, the remainder of the American copper triumvirate, have yet to announce any headway with the union.

In these circumstances the London quotations are still considering the US industry as strikebound. If no settlement is reached—and here is meant a country-wide settlement—London prices will again move sharply upwards. As it is they will not react violently to any settlement in the US as the shortage of metal is now bound to continue for a couple of months. In the US the price structure is unchanged, with producers quoting 33 cents and custom smelters 35 cents a pound.

Tin reacted sharply to the settlement of the US steel dispute. In London, demand is satisfactory.

Lead is a better market in London than in New York, where the price is now 12 cents a pound, and large stocks overhang the market. In London demand is good and nearby metal is relatively scarce. Indeed, there is a backwardation. But this is not expected to continue for very long. The price is not far short of £75 a ton. Zinc is a good market on both sides of the Atlantic.

Official metal prices in London yesterday (Thursday) were:—COPPER, Standard: Prompt £253 10s., forward £243 15s. TIN, Standard: Prompt £793 10s., forward £785 10s. LEAD: Prompt £74 10s., forward £74. ZINC: Prompt £95 10s., forward £90 15s.

Industrial Output Still Rising

RISE in Britain's industrial production continues. Towards the end of 1959 it was running at between 9 and 10 per cent. above the level of a year previous. The provisional index of industrial output for November is 116-117 (seasonally adjusted), compared with 116 for October and 107 for November, 1958. On this basis output in October and November combined was some 2 or 3 per cent. higher than in the third quarter.

Industrial revival is now seen on a much broader base than earlier in the year when it was limited for the most part to motor-car manufacturers and makers of domestic goods. An important contribution is now being made by steel, the mills in November working up to 95 per cent. of capacity. Heavier industries still have some way to go to reach the level of steel demand achieved in other sections. It is now certain that some users have begun to rebuild stocks of steel and a slight swing from the heavy steel manufacturers to the re-rollers is also noted.

One barometric reading of the state of trade can be obtained from the machine-tool industry. The lengthening of manufacturers' order-books which began last summer seems to be steadily maintained.

MILLSPAUGH, LIMITED—Mr. H. V. Dearden has been appointed a director.

ECSC Scrap Fraud Alleged

SERIOUS allegations that the scrap compensation fund of the European Coal and Steel Community had been swindled of an equivalent of £1,000,000 were made before the European Parliament last week by the examination committee of the Community's High Authority. It was stated that an inquiry had been made by the committee at the request of a Dutch scrap dealer. It had resulted in the discovery that false declarations had been made in respect of 99,000 metric tons of scrap and questionable documents had been issued for a further 60,000 tons.

Compensation of up to $20 per metric ton had been paid out on the strength of the fraudulent documents and it is supposed that similar sums were also obtained by false pretences in the case of the "questionable" documents. The quantity of scrap believed to have been concerned is given as 110,000 metric tons.

According to a spokesman of the High Authority in The Hague, proof of the frauds is to be passed on to the governments of the ECSC member countries and prosecution of the firms concerned requested. Not one of the member countries was without culprits, it was stated. The auditing of the fund by a Swiss firm had proved that no fault lay with the fund's book-keeping itself.

Good Demand for Brook Motors' Products

"EXCEEDINGLY good" demand exists for the products of Brook Motors, Limited, Huddersfield, according to the chairman, Mr. F. V. Brook, who says that there is every sign that the upward trend in demand will continue. Recent months have seen an improvement in most markets, which Mr. Brook thinks may be due in no small measure to the better international atmosphere.

Canada exceeded expectations in the year ended September 30, 1959, its first year of operation, and other oversea markets showed varying conditions. There was also an improvement in direct export sales. At home the fractional horsepower motor factory has been extended and this will contribute to increased production and reduced costs.

Mr. Brook gives a warning that since the abandonment of price agreements following the Restrictive Practices Act, there has been a move by many companies to obtain a larger share of the available demand by reducing prices and competition will be keen. Regarding the proposed one-for-six scrip issue it is emphasized that the capitalization of reserves will not influence the directors in deciding upon the amount of profit to be distributed by way of dividend in the future.

MR. G. W. SMALES, assistant secretary of Cochranes (Middlesbro') Foundry, Limited, has been appointed deputy general manager. He will continue as assistant secretary.

IN A NEW YEAR message, Mr. Eric Lockett, general secretary of the Yorkshire Area of the National Association of Colliery Overmen, Deputies, and Shotfirers, pointed to 68 fatal accidents at Yorkshire collieries in 1959, compared with 43 in 1958. "Every man," he said, "whether a manager or workman, ought to make a resolution that safety is going to be the key word in his working life."

Coalfield News

ABOUT 60 MINERS ARE being retained on salvage work at Montagu Main Colliery, Newcastle-upon-Tyne, which has been closed on the exhaustion of its reserves. Sunk in 1761, it formerly employed 840 men and boys.

THE NCB'S BORING TOWER is due to be moved to a new position off Tynemouth within the next week or so. It is at present 1.7 miles due east of the harbour and has been operating in the area for the past two months.

IT HAS NOW BEEN stated by the Durham Divisional Coal Board that the future of Derwenthaugh Staithes, Blaydon-on-Tyne, is "under consideration." For many months the amount of coal handled at the staithes has been falling, and there have been rumours that they were to be closed.

MINERS WOULD HAVE no regrets at seeing the end of 1959 and would hope for a brighter future in 1960, said Mr. Alwyn Machen, president of the Yorkshire Area of the NUM, in a New Year message. He added: "In 1960 we hope to achieve a unity within the industry and a higher standard of living for miners."

DECISION TO RESUME WORK and to give 14 days' notice to the management to terminate all contracts on mechanized faces was taken on Tuesday by a mass meeting of some 700 miners from Keresley Colliery, Coventry. The strike which began during Monday morning originally affected 200 men, mainly strippers, who have a wage grievance. By Tuesday 700 were out and the pit was at a standstill.

SHIPMENTS OF COAL AND COKE from the South Wales ports continue to be satisfactory. Last week's total of 53,036 tons was 6,735 tons up on the previous week's total and 7,132 tons greater than in the corresponding week a year ago. Exports from the various ports (with last year's corresponding figures in parentheses) are as follow:—Newport, 7,876 (7,149) tons; Cardiff, 3,283 (7,255) tons; Penarth, 3,824 (5,125) tons; Barry, 7,945 (13,644) tons; Port Talbot, 916 (1,358) tons; Swansea, 24,192 (11,373) tons.

No. 7 AREA of the NCB, in a memorandum issued this week, hopes that the improved and still improving position in the area, comprising north Leicestershire and south Derbyshire, will encourage ex-miners to rejoin the industry. The appeal is aimed at miners who left the pits during the past two years due to adverse publicity about the stockpiling of coal. The outlook for 1960, says the memorandum, is encouraging due to the increasing generating capacity in the district and there should be very little worry in the Area. It is expected that the lifting of stock will continue in the Area at a good rate, and in order to ensure that the manpower is available to get the coal required the board has decided to embark on a recruiting drive.

SOUTH DURHAM PIPES FOR NORTH AFRICA

A CONTRACT with the Esso Petroleum Company, Limited, has been negotiated with the South Durham Steel & Iron Company, Limited, for 100 miles of 30-in. steel pipes for the development of the oilfields in Libya. The value of the contract, consisting of 23,000 tons, is approximately £1,430,000.

This is the first contract South Durham has secured for the delivery of steel pipes in north Africa and the contract was secured against intense continental competition. The manufacture of these steel pipes is due to commence in April next and delivery is required to be completed by September of this year.

TUC to Back Miners' Coal Campaign

LEADERS of the National Union of Mineworkers succeeded on Tuesday in persuading the TUC to support its campaign to increase consumption of coal. The NUM delegates and the TUC production committee agreed that a joint approach should be made to the Government on the industry's plight. The miners' leaders suggested that an interview should be sought with the Prime Minister, but as he will be away in Africa for the next six weeks, other Ministers may be approached before his return. The case has already been put to Mr. Richard Wood, Minister of Power, who could give no hope that the Government would take measures to restrict the use of oil or compel industry to use more coal.

Putting the union's case on Tuesday, the NUM general secretary, Mr. Will Paynter, pressed for a national fuel policy which would include further cuts in open-cast mining and restrictions on imports of fuel oil. The NUM also favours Government help towards the cost of stocking coal and meeting compensation claims for ending open-cast contracts.

During a visit to the Sheffield Safety in Mines Research Establishment on Tuesday, the Minister of Power commented on Mr. Paynter's statement on Monday on consumers changing from coal to oil.

The Government, he said, was convinced that the present fuel policy was the logical one to encourage competition so that people could get fuel as cheaply and efficiently as they wanted it. Any attempt to guarantee certain shares of the fuel market to coal and oil, and so on, would mean some consumers would be compelled to use the kind of fuel which they did not think would best serve their interests. "I do not support any suggestion of forcing local authorities by the threat of unpleasant action to do what they would consider to be against their best interests," he said.

Mr. Bert Wynn, secretary of the Derbyshire Area of the NUM, said the union in his Area would bring the strongest possible pressure to bear on local authorities and governing bodies in various walks of life and revealed that a series of conferences is to be called within the next few weeks between miners' representatives and Labour Party representatives on local councils, and all local Labour parties and trades unions. "We shall ask our members," he said, "to keep away from all social and recreational places which switch to oil and to keep out of pubs not heated by coal—they can always get their beer in the Miners' Welfare."

Mr. Alwyn Machen, president of the 100,000-strong Yorkshire Area of the NUM, said he would not be opposed to miners boycotting cinemas and dance halls which planned to switch to oil heating.

United Wire Works Pays Bonus

ALTHOUGH the 2½ per cent., tax free, bonus being paid by United Wire Works, Limited, Edinburgh, with the increased dividend of 15 per cent., tax free (equivalent of 11¼ per cent.), for the year ended September 30, 1959, cannot be considered a regular feature, the chairman, Capt. W. D. T. Green, states that it is not impossible that there may be something similar next year.

He reports that business during the first 12 weeks of the current year continued on as satisfactory a level as last year.

Board Changes

VAB PRODUCTS, LIMITED—Mr. I. Lloyd has resigned from the board.

F. A. STANDEN & SONS, LIMITED—Mr. R. Pease has been appointed a director.

MIDLAND TAR DISTILLERS, LIMITED—Mr. Wilfred F. Dines has joined the board.

BERALT TIN & WOLFRAM, LIMITED—Mr. G. W. Flint has been appointed a director.

DAVIS & TIMMINS, LIMITED—Mr. Ernest B. M. Grubb has been appointed a director.

H. & C. DAVIS & COMPANY, LIMITED—Mr. R. E. Johns has resigned from the board.

HENRY SIMON (HOLDINGS), LIMITED—Sir Malcolm Trustam Eve has resigned from the board.

LONDON ELECTRIC WIRE COMPANY & SMITHS, LIMITED—Mr. A. E. Kay has been appointed a director.

ACME CONVEYORS, LIMITED—Mr. J. Boyd Blakeborough has been appointed joint managing director.

TUNNEL PORTLAND CEMENT COMPANY, LIMITED—Mr. S. V. Hagdrup has retired from the board on reaching the retirement age.

LAPORTE TITANIUM, LIMITED—Mr. D. J. Oliver has been appointed a director of the company, a subsidiary of Laporte Industries, Limited.

SUPERHEATER COMPANY, LIMITED—Mr. Harold Melhuish, assistant managing director, has retired on pension, but will remain a director.

JACOBS MANUFACTURING COMPANY, LIMITED—Mr. J. C. Greig has been appointed sales director of the company and its associate, Frank Guylee & Son, Limited.

EDMUNDS, WALKER & COMPANY, LIMITED—Mr. J. R. Stopar and Mr. P. M. Lambirth have been appointed directors. Mr. Lambirth relinquishes the post of secretary.

VICKERS-ARMSTRONGS, LIMITED—Mr. F. P. Laurens, assistant managing director, production, of International Computers & Tabulators, Limited, has resigned from the board.

BRITISH OVERSEAS ENGINEERING & CONSTRUCTION CORPORATION, LIMITED—Mr. Grenville Naylor has joined the board of the company, one of the Taylor Woodrow group.

BAIRD & TATLOCK (LONDON), LIMITED—Mr. H. Fletcher, Mr. J. W. Hobday, and Mr. G. Henderson, directors of Derbyshire Stone, Limited, have been appointed to the board.

BROWN BROS., LIMITED—Mr. A. M. Mackintosh, who recently retired as general manager, sales, of Shell-Mex & B.P., Limited, after serving that concern for many years, has joined the board.

BROOKE MARINE, LIMITED—Mr. C. M. Cock has joined the board as a deputy chairman on his retirement as general manager of the traction department of the English Electric Company, Limited.

SOUTH CROFTY, LIMITED—Mr. J. E. Denyer has been appointed chairman of the company and its subsidiary, Great Western Ores, Limited. He succeeds Mr. Thomas Pryor, who has retired from both companies.

FREDERICK BRABY & COMPANY, LIMITED—Mr. A. J. W. Green, who recently joined the board, has been appointed joint managing director. He is a director of Auto Diesels, Limited, which was acquired by the company in October.

MOLER PRODUCTS, LIMITED—Mr. Robert W. Young has been appointed chairman. Mr. William J. Shaw and Mr. Ralph D. Hart have been appointed joint managing directors. Mr. Robert Wood, chairman and managing director, has resigned from the company.

RANSOMES & RAPIER, LIMITED—Sir Peter Roberts, MP, has succeeded Col. R. P. W. Adeane as chairman. Col. Adeane is now vice-chairman. Sir Peter is chairman of the parent company, Newton, Chambers & Company, Limited, of which Col. Adeane is a director.

ARMSTRONG WHITWORTH (METAL INDUSTRIES), LIMITED—Mr. Charles Pullan, sales director of the company and its subsidiary, Jarrow Metal Industries, Limited, has retired from executive duties after 30 years with these companies. He remains on the board in a consultative capacity.

SUBMARINE CABLES, LIMITED—Mr. F. W. H. Shaw has been appointed managing director of the company, which is owned jointly by Siemens Edison Swan, Limited, and the Telegraph Construction & Maintenance Company, Limited. He succeeds Mr. F. S. H. Lemon, who has retired.

ESSO PETROLEUM COMPANY, LIMITED—Mr. G. W. Powell, a director since 1957, has been appointed a managing director. He joined the company in 1923 and was appointed general manager (marine) in 1954. From 1939 to 1948 he served with the Petroleum Board as manager of the south-west region.

CHARRINGTON, GARDNER, LOCKET & COMPANY, LIMITED—Sir John Charrington has relinquished his position as managing director, but will continue as chairman. Mr. K. M. Stobart has been elected vice-chairman, and Mr. Stobart, Mr. H. D. B. Lorraine, and Mr. John Charrington have been appointed managing directors. Mr. C. P. Humphris has joined the board.

GERRARD INDUSTRIES, LIMITED—Consequent upon the acquisition by the United Steel Companies, Limited, of a minority interest in the company, Lt.-Col. P. F. Benton Jones, a director of that company and many of its subsidiaries, has joined the board. Mr. M. F. Barnard, group sales manager, has also been appointed to the board following the resignation of Mr. George S. Johnson after 20 years as a director.

STANDARD-ENFIELD POWER CABLES, LIMITED—Mr. F. C. Wright, managing director of Standard Telephones & Cables, Limited, and Mr. John Grimston, managing director of Enfield Cables, Limited, and Enfield Rolling Mills, Limited, will alternate as chairman of the company, which has been formed to handle the merged power cables businesses of Enfield Cables and STC. General manager of the company will be Mr. E. C. Lee.

BRIGHTSIDE ENGINEERING HOLDINGS, LIMITED—Mr. R. Ivor Slater has resigned as secretary on his appointment as managing director of a subsidiary, Moorwoods, Limited. Mr. W. S. Richards has been appointed managing director of another subsidiary, Brightside Heating & Engineering Company, Limited, of which he has been a director for some years. Mr. James R. Nuttall has been appointed secretary of Brightside Engineering Holdings in place of Mr. Slater.

DAVEY, PAXMAN & COMPANY, LIMITED—Mr. W. J. Ruston has been elected chairman in the place of Mr. Harold Riggall, who has resigned from the board on his retirement from the managing directorship of the parent company, Ruston & Hornsby, Limited. Mr. V. R. Prehn has been elected deputy chairman in succession to Sir Percy Sanders, who has resigned for health reasons, but remains a member of the board.

FRED MYERS, LIMITED—Mr. Peter Hamilton has joined the company as managing director. He has had considerable experience in the sphere of heavy earth moving equipment, from both American and British sources, and recently pioneered into this country the introduction of a new range of American construction equipment and materials handling plant. Major-General D. C. T. Swan has, owing to private commitments, resigned from the board.

Company Statement

THE UNITED STEEL COMPANIES

Increasing Demand

SIR WALTER BENTON JONES ON THE OUTLOOK

THE annual general meeting of The United Steel Companies, Limited, will be held on January 28 at the Iron and Steel Institute, 4, Grosvenor Gardens, London, S.W.

The following is the circulated statement of the Chairman, SIR WALTER BENTON JONES, Bt.:—

Introduction

A company, by its constitution, has a board of directors appointed by the shareholders, and the directors appoint one of their number to be their chairman. The directors of our company have appointed me to be their chairman and I have had the honour to occupy this position for a number of years.

The statement I am making, it is true, is my own composition. Nevertheless, in effect, it is an elaboration of the Directors' Report, but I am allowed the privilege of putting in a few odds and ends which are *obiter dicta,* as indeed is this introduction.

In composing a statement which is in the nature of an annual review, it can cover many subjects, but it is open to doubt if long statements are read by many. On this occasion I shall try to be brief. This is not a discourtesy, it is because I want to point a highlight on a particular subject—the technical changes which are taking place in the making of iron and steel.

To assist those of you who will find interest in the working of our Branches, as I hope all of you will, a short reference is made to each of them in an appendix.

Nationalization

For the present the overloaded nationalization wagon has not had the Steel Industry added to its load. Is it an over-simplification to say that fundamentally private enterprise is personal whereas nationalization is impersonal? The people of our country have resolved to retain personal enterprise and it is to be hoped that this resolution will become still stronger as time passes.

Our company is composed of a number of units each of which is a personal community. In general terms everybody knows everybody else. And all these communities over a long period of years have got to know one another so well and to help one another so willingly and intelligently that the whole company regards itself and conducts itself as a community of persons—a community of 35,000 operators and 35,000 proprietors. That ideal has been, and in the future will still be, the aim of the administration.

Subjects

The things I am going to talk about are:

1. How we have come through the recent recession.
2. In a purely technical story, the recent revolutionary processes of making iron and steel which have been and are still taking place, and what we have done and are doing about them.
3. Our near-future prospects.
4. Our present financial state.

How We Have Come Through the Recent Recession:

In November, 1958, when my last statement was written, we had reached the end of a long period of striving to make production catch up with demand. We were uncertain whether this was a lull or the beginning of a slump. We all hoped it was a lull which might not last longer than the third quarter of the current year. This hope has been realized. I need not enumerate all our fears and hopes in the meantime and the many factors and markets on which our fortunes depended.

Although we do not make wide strip, for which the demand has not diminished, we have a substantial shareholding in John Summers & Sons who specialize in this product, and we ourselves are the largest makers of medium and narrow strip in the United Kingdom.

Excluding wide strip, we own 15.6 per cent. of the country's steelmaking capacity, and we were successful this year in producing 17.2 per cent. of its output.

Steel Story

We speak of steel as if it were a single thing. In fact, although the greater part is what we may call, with great respect, common or garden steel, there are infinite varieties of high-grade special steels. They are made for a hundred and one purposes. We make both common or garden steel and a great variety of special steels.

Common or garden steel is made in two ways, one we call the hot metal process and the other we call the cold metal process.

In the hot metal process molten iron is charged directly from the blast furnace into steel converters or furnaces in which the iron is converted into steel. In the cold metal process a mixture of iron and steel scrap together with cold pig-iron is remelted and refined in steel furnaces.

It is estimated that in our country 75 per cent. of steel is made by the hot metal process and 25 per cent. by the cold metal process.

In previous statements I have told you of the progress we have made at Appleby-Frodingham in the working of iron ore and in beneficiation of ore and in blast-furnace practice. These evolutionary stages now make it possible for us to make twice as much iron in our blast furnaces, which are large and modern, as was possible 10 years ago and at the same

time to reduce by a third the amount of fuel needed to make a ton of iron.

In step with these evolutionary developments in ironmaking we have been looking hard at steel.

Steelmakers all over the world are just now examining and introducing revolutionary methods of converting iron into steel.

The outstanding feature in this revolution is the use of oxygen—or correctly speaking the substitution of neat oxygen for combustion and refining for atmospheric air of which oxygen is only one fifth part. There is nothing new in the idea of using neat oxygen for these purposes, but it has not been used generally in the past either because existing methods were sufficiently economical or because the methods of isolating oxygen on a large scale had not been sufficiently developed.

There are several methods of introducing oxygen. Some require the substitution of entirely new steelmaking plant, but some can be applied by adaptation of existing plant.

At Appleby-Frodingham works, where we make by the hot metal process 1,400,000 tons of steel in a year, we have invented a method of our own which we call the Ajax process. This has already been applied to two of the Appleby-Frodingham 10 steel furnaces, and the result has been to increase their production by about 75 per cent. In the Ajax process also there is a reduction in fuel consumption of over 70 per cent. This year the process will be applied to a third furnace. We are engaged in building an oxygen making plant to augment our supply to these furnaces.

Incidentally, our Ajax process equipment is patented and a firm of furnace builders has been licensed to manufacture it to our designs, for other steelmakers.

In the cold metal process, following careful and full examination we have reached the conclusion that future economy and efficiency indicate that the most forward-looking policy would be to discard the type of steel furnaces which are commonly used and which are known as open-hearth furnaces and to substitute for them electric furnaces. At Samuel Fox for some years we have been making special steel in increasing quantities in electric furnaces. But at Steel, Peech & Tozer, where we make by the cold metal process over 1,000,000 tons of steel a year in open-hearth furnaces, although these furnaces are comparatively modern, we intend over the next five years to replace them step by step with electric furnaces.

We believe there are no other steelworks in this country or in the world of comparable size in which up to now electric steel melting has been substituted for melting by the cold metal process in open-hearth furnaces.

Another development in which we are engaged is what is known as continuous casting.

In normal practice the ingots into which steel is first cast are very large and the practice is to reduce the size by a first rolling in gigantic primary rolling mills, after which they pass into small mills for shaping into different sizes.

In many cases if the steel could be cast into smaller forms directly it leaves the steel furnace, the large primary rolling mill would not be needed. Members of our staff have been engaged for some time in developing and improving an experimental continuous casting plant at the Barrow Steel Works which we manage on behalf of the Iron and Steel Holding and Realization Agency. Continuous casting has now been proved to be successful and we are satisfied that it can be used commercially in many cases, not all of which have yet been developed.

We have completed an agreement with Concast A.G. of Zurich, which enables us to use their patents and know-how without charge for machines which we may build for ourselves, but we are also entitled to build machines for others under licence.

I have mentioned these purely technical matters because taken together they do constitute a very large step forward in the making of steel. They affect a large part of our undertaking. We have started upon them early and have not waited to follow developments which have been first proved by others.

There are many other things in our steelworks which we have done and are doing and which are not only modernizing processes, but also are extensions and elaborations of products. For example, at Samuel Fox, where we made last year about 333,000 tons of special and alloy steels including 40,000 tons of stainless steel, the works have been very largely rebuilt in the last 10 years. But the developments through the stages of iron and steel making to which I have referred are new developments. They are far reaching and are the beginnings of what it seems may soon become common practice.

Our Near Future Prospects

In general, the recession ended in the early spring of this year. Since that time there has been an increasing improvement in the demand for all our steel products except for those manufactured by certain specialized departments which in the main provide materials for the railways and the coal-mining industry, but in some cases we have been able to substitute other products.

The intense demand for consumer goods, the restocking programme by all consumers together with fair prospects in the export market lead to an encouraging picture.

It is true that the demand for some capital goods has not yet reached the previous high level, but we believe we shall continue to work to near full capacity and the prospects of the company for this current financial year are therefore bright.

Our Present Financial State

The Report and Accounts with their notes are so full and so clear that it would be only repetition for me to point to this or that in any part of the Balance Sheet or in the Profit and Loss Account.

The charge for depreciation together with the transfers to fixed assets replacement reserve amount to £7,099,000 for the year and the provision for taxation to £7,091,000. Current assets less liabilities at £26,619,000 are £2,942,000 greater than in the previous year. Quoted trade investments stand in our books at £1,339,000; at September 30 their market value was £4,314,000. Our cash and short-term securities at about £7,500,000 are little changed.

Perhaps the most interesting and easily appreciated records are the graphs at the end of the Accounts which show the actual rate of output and the net earnings in the years from 1951 up to the present time.

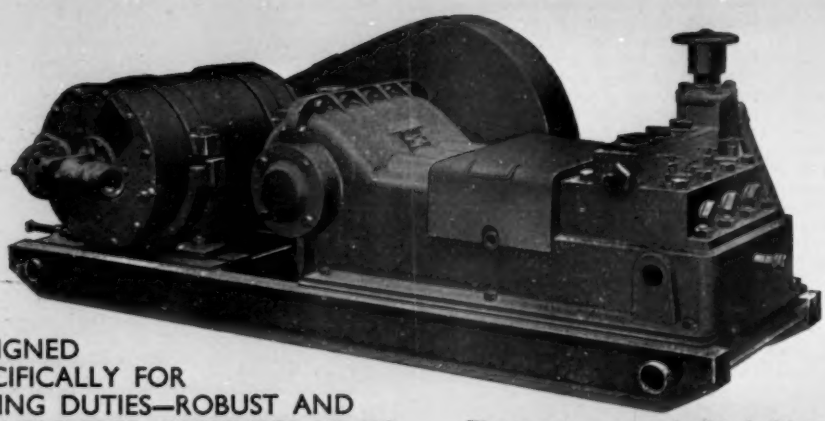
Outputs of the Company's principal basic products have been:—

	1951.	1957.	1958.	1959.
Steel ingots ..	2,103,000	2,855,000	2,708,000	2,597,000
Pig-iron ..	1,091,000	1,748,000	1,690,000	1,757,000
Coke ..	1,188,000	1,592,000	1,528,000	1,591,000
Iron ore ..	3,403,000	4,868,000	4,718,000	5,207,000

The financial statement of employment of capital shows the growth of the company's business. Fixed Assets and Trade Investments are approximately two

EVANS

HYDRAULIC EQUIPMENT FOR FACE MECHANISATION AND WATER INFUSION



DESIGNED SPECIFICALLY FOR MINING DUTIES—ROBUST AND TROUBLE FREE—PRESSURES UP TO 5,000 P.S.I.

These pumps can now be fitted with an unloading device which eliminates entirely the temperature rise of water

JOSEPH EVANS & SONS (WOLVERHAMPTON) LTD.
CULWELL WORKS, WOLVERHAMPTON. Tel. 20864

This 'new look' transformer offers better cooling, easier maintenance

Economy in cost, maintenance and space requirements are the outstanding features of this 'new look' range of distribution transformers. New techniques in methods of manufacture have produced a transformer which is cleaner in design, easier to maintain and of proven dependability. It is of the radiator type with good cooling characteristics, and a low frequency of vibration which ensures a low noise level. This range of transformers, for 200 KVA service upwards, complies with the T.1. (1958) specification in all respects. Write for further details.

SWS

SOUTH WALES SWITCHGEAR LIMITED

BLACKWOOD · MONMOUTHSHIRE · WORKS AT TREFOREST AND BLACKWOOD
SWITCHGEAR · SWITCHFUSEGEAR · TRANSFORMERS · CONTROL BOARDS

S.W.1(a)

and three quarter times greater than they were in 1951 and the capital employed is more than three times greater.

Iron and steel companies use a lot of capital in the installation of plant, but even when it has been installed it is inevitable that apart from maintenance, which in any case is very heavy, special expenditure is needed to keep in step with developments and improvements. Such expenditure in this peculiar industry can hardly be regarded as capital expenditure; it needs to be provided to keep the industry alive.

The activities that I have described in my story about steel will cost money, but they will be spread over a few years and we do not expect that they will unduly burden our financial resources. They are an example of what I mean when I say steel companies have to spend large sums of money to keep themselves alive.

In conclusion, we would like to thank our fellow shareholders for the support which they have given us in the past, and we would like to think that they will welcome and commend the actions which we are taking in this present time of rapid change.

The Scrap Markets

A Good Start

THE scrap trade has got off to a good start in 1960. There was a slow-down of deliveries during the Christmas and New Year holidays, but there was a brisk movement of supplies during the past week with every prospect of its continuance.

Steelworks maintain their heavy demands for processed material and their interest now embraces also light material.

Cleveland—Supplies for the steelmakers continue to move away freely. Steelfoundries are accepting all available supplies of short heavy steel scrap and there is a much more active market for all grades of cast-iron scrap with emphasis on machinery and heavy classifications.

Midlands—There is no slackening in the demand for practically all grades of scrap. Most users, in fact, accepted supplies over the normally quiet holiday period. The steelworks appear to be working on slightly reduced stocks following the recent slack period which enabled furnaces to be brought to a high state of repair and efficiency. There are now many melting plants operating at full capacity. The blast furnaces are also extremely busy and all types of light scrap and shovellable and bushy turnings are now very scarce. Merchants are finding that competition for new production contracts is outstripping present market prices and the days of cheap scrap are over, and will be for some considerable time to come.

The ironfoundries are enjoying a renewed burst of enthusiasm, and demand for all grades of scrap is finding a less responsive market as the weeks go by.

Scotland—Business this week has been hampered by holiday conditions. Most producers of scrap closed down on Thursday of last week for a few days and, in consequence, there have been little or no arisings this week. The steelworks, however, remained open to accept deliveries during the holiday period; they were only too pleased to accept any consignments offered to them. There is every prospect of the year ahead being a more favourable one for the scrap trade from all points of view than last year proved to be.

Nuclear Power Group's Fusion

UNDER the title of the Nuclear Power Group, Limited, two of Britain's nuclear power companies—the Nuclear Power Plant Company, Limited, and the A.E.I.-John Thompson Nuclear Energy Company, Limited—have become partners. Chairman of the board of the group is Viscount Chandos, who is also chairman of Associated Electrical Industries, Limited, and its principal subsidiaries, and a director of Imperial Chemical Industries, Limited, and the vice-chairman is Mr. R. Edwin McAlpine, a director of Sir Robert McAlpine & Sons, Limited, and associated companies.

Among the objects of the new group are the design, development, and sale of nuclear reactors of all kinds, the construction of complete nuclear power stations at home and abroad, and the construction of nuclear units for ship propulsion. It will also supply necessary components and materials and conduct research and development in matters concerning nuclear energy. The nuclear power stations at Bradwell (Essex) and Latina (Italy), which are at present under construction by the Nuclear Power Plant Company, and the nuclear power station at Berkeley (Gloucester), which is being built by A.E.I.-John Thompson Nuclear Energy Company, are to be completed by the two companies in partnership.

Headquarters of the group will be at Radbroke Hall, Knutsford (Cheshire), and each company will have three representatives on the board—Viscount Chandos, Sir Edward Thompson, and Mr. Harry West (A.E.I.-John Thompson), and Mr. R. E. McAlpine, Mr. H. H. Mullens, and Sir John Wrightson (Nuclear Power Plant). Mr. A. J. Sayers will be general manager.

The merger brings together in the field of nuclear power plant construction and research Associated Electrical Industries, Clarke, Chapman & Company, Limited, Alex. Findlay & Company, Limited, Head, Wrightson & Company, Limited, Sir Robert McAlpine & Sons, C. A. Parsons & Company, Limited, A. Reyrolle & Company, Limited, Strachan & Henshaw, Limited, John Thompson, Limited, and Whessoe, Limited.

Esso Plans 75-Mile Pipeline at Cost of £2,500,000

PLANNING permission to lay a 75-mile oil products pipeline from its refinery at Fawley, near Southampton, to a new distribution depot, having a storage capacity of 20,000,000 gallons, near London Airport, is being sought by the Esso Petroleum Company, Limited. The total project will cost, it is estimated, £2,500,000.

The proposed route of the pipeline, which will be buried to a depth of at least 3 ft. over the whole distance, will carry it under Southampton Water and under the Thames. It will also pass under several railways, major highways, paved roads, rivers, and canals. The pipeline will be all welded and specially protected against corrosion, and it will have an initial capacity of £1,500,000 gallons a day. It is hoped to commence work this year; completion is planned by the early part of 1963.

This will be the first large-scale commercial pipeline for refined products to be laid in Britain.

Photograph by courtesy of N.C.B. Northern (N & C) Division, No 3. Area

Recognised throughout the country

THE 'SEAMAN'
SELF-ADVANCING SUPPORT SYSTEM

The illustration shows one of the FIFTY SUCCESSFUL FACE INSTALLATIONS of the 'Seaman' Self-Advancing Support System now operating in this country, chosen because this is the only system incorporating ALL these advantages.

★ SAVES MANPOWER ★ SPEEDS SUPPORT SETTING
★ INCREASES BULK OUTPUT ★ ELIMINATES ALL FACE SUPPORT LOSSES

MODERN MINING METHODS

GULLICK LIMITED · KIRKLESS STREET · WIGAN
Telephone: WIGAN 46225 (3 lines)

G20

Orders Placed

Town Gas from Low Rank Coal

CONTRACT worth £6,500,000 for the installation by the West Midlands Gas Board of high-pressure coal gasification plant on a new site at Coleshill (Warwickshire) has been awarded to the Woodall-Duckham Construction Company, Limited, London, S.W.3. The installation will include tonnage oxygen plants, Lurgi-type complete gasification generators, and extensive ancillary plants for gas treatment and enrichment, by-product recovery, effluent treatment, and coal and ash handling.

The gas manufacturing capacity will be 40,000,000 cub. ft. daily and provision made for future extension in two stages to 80,000,000 cub. ft. and 120,000,000 cub. ft. daily. The generators are designed to gasify low rank, small coals from the Midland coalfields.

The work to be carried out by Woodall-Duckham commences with the green site and continues to full gas production from the installation in 1963.

DESIGN AND construction of a polyethylene plant for Union Carbide (Australia) is to be undertaken by George Wimpey & Company, Limited, London, W.6. Value of the contract is £A4,000,000.

TO BE USED FOR the excavation of limestone, three 110-RB electric shovels with Ward-Leonard control have been ordered from Ruston-Bucyrus, Limited, Lincoln, by a Swedish concern. The order is worth £180,000.

CONTRACT FOR the construction of the new tank farm for the new Regent oil terminal at Granton Harbour has been awarded to the Redheugh Iron & Steel Company, Limited, Gateshead. It is worth more than £100,000.

A SAND SUCTION dredger is to be built by Charles Hill & Sons, Limited, Bristol, for T. R. Brown & Sons, Limited, also of Bristol. The 1,000-ton vessel will be powered by Ruston & Hornsby diesel engines and will be delivered towards the end of the year.

TO BE ERECTED at its Slough (Bucks) factory, an additional polyvinyl acetate emulsion plant has been ordered by National Adhesives, Limited, from the Blaw Knox Chemical Engineering Company, Limited, London, W.2. The plant is scheduled for completion in mid-1960.

MANAGING DIRECTOR of Lamet Trading, Limited, London, E.C.1, Mr. Peter Adam, and Mr. George Wallis, a director, arrived at London Airport last Friday from China, where they had been successfully negotiating a £2,500,000 Chinese order for steel goods.

AN ADMIRALTY ORDER has been placed with Ibbett Engineering Company, Limited, Kempston Hardwick (Beds), for 3-ton transporters to be used in naval dockyards. As a result of this order and other substantial orders from home and oversea the company is to enlarge its factory and instal additional plant and equipment.

INITIAL PART OF a £100,000 contract for a materials handling plant in northern Spain has been awarded to E. G. Irwin & Partners, Limited, London, S.W.1. The contract is exclusive of the building and civil engineering work necessary. The work is being undertaken for the Spanish steel concern, Ferroaleaciones Y Electrometales, SA, Santander.

CRANE CONTROLS valued at nearly £60,000 have been ordered from Brookhirst Igranic, Limited, a Metal Industries, Limited, group subsidiary, by Joseph Adamson & Company, Limited, Hyde (Ches). The controls will be installed in two hot metal ladle cranes and 12 overhead travelling cranes which Joseph Adamson & Company is supplying to the Steel Company of Wales, Limited.

LARGEST TWO-SPEED conventional cross-compound turbine generator in the world has been ordered from Associated Electrical Industries, Limited, by the Central Electricity Generating Board for its Thorpe Marsh power station, near Doncaster. The contract is worth £3,750,000. The equipment will generate at 50 cycles per second. Design and manufacture will be carried out at the Trafford Park Works, Manchester.

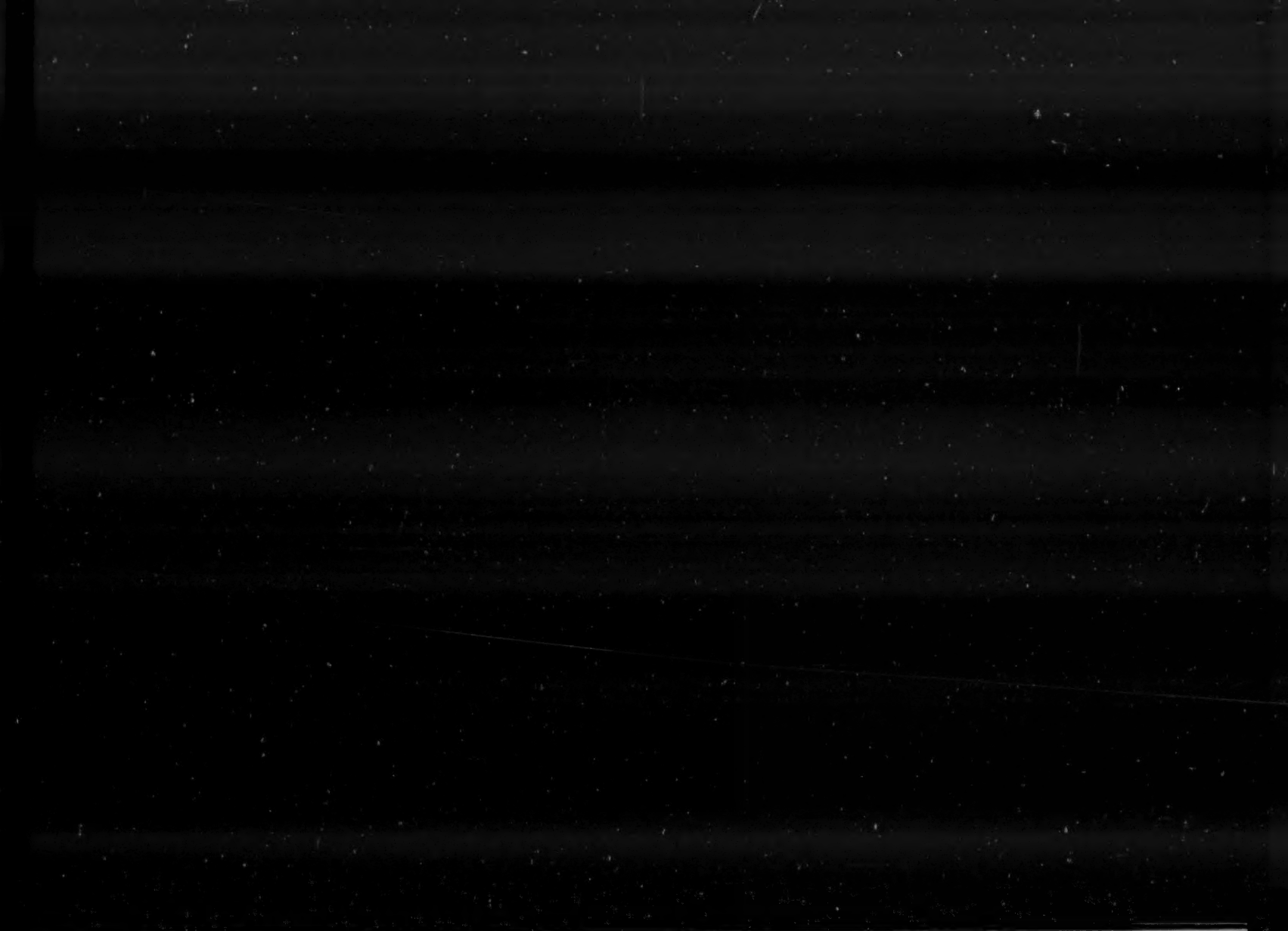
PERKINS ENGINES, LIMITED, Peterborough, has received orders for 1,430 1.6-litre Four 99 marine and industrial diesel engines from the US. Value of the engines is about $700,000 (£250,000). Some of the engines will be used in reefer mobile refrigeration units made by the Transicold Corporation, Los Angeles. The Peterborough firm is also supplying 230 Four 99 marine diesels to customers on the Pacific and Atlantic coasts.

CONTINUOUS, AUTOMATIC heat-treatment plant for the hardening and tempering of nuts and bolts has been ordered from the Electric Resistance Furnace Company, Limited, Weybridge (Surrey), by A. P. Newall & Company, Limited, Glasgow. The order is valued at £33,000. The Surrey company has also received an order from the United Kingdom Atomic Energy Authority for furnaces for the heat-treatment of nuclear fuel elements. This order is worth over £15,000.

Engineering Unions Revive Wage Claim

ON Tuesday the Confederation of Shipbuilding and Engineering Unions returned to the attack with its claim for £1 a week wage increase and a 40-hour week. The employers, through Sir Kenneth Hague, president of the Engineering and Allied Employers' National Federation, held out little hope of second thoughts about the wage claim, but promised to consider the demands again and reply on January 26.

Sir Kenneth suggested that a joint committee should be set up to examine the question of shorter hours so that his negotiators might at least be able to make a recommendation to the industry. This was rejected and the position now is that a report of the proceedings—but no guidance on what should be done—will be sent to the 4,300 companies in the federation next week.

For the confederation Mr. W. J. Carron, chairman of its engineering committee and president of the AEU, told the employers that their arguments in support of rejection of the wage demand were "largely irrelevant." Wage rates, he said, as distinct from earnings, were only 3 to 5 per cent. higher in real terms than in 1946, while productivity had increased on the average by 75 per cent.

He said he was shocked at the implication in the employers' statement in November that the workers were not entitled to share the benefits of higher productivity brought about by new plant, techniques, research, and development. He had believed that everybody now accepted as a cardinal principle that innovations to raise productivity must benefit the worker as well as the management. Mr. Carron, who is president of the British Productivity Council, added that he began to wonder whether he and his colleagues on the council had all been wasting their time so far as the engineering industry was concerned.